# Service Manual

Colour Video Cameras

## MODELS WV-3030E/WV-3030N

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**Panasonic/National**

ORDER NO. VKD81070560C8

# Service Manual

Vol. 1

## *Circuit Description*

Colour Video Cameras

# WV-3030E/WV-3030N

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**Panasonic / National**

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# CIRCUIT DESCRIPTION OF CAMERA HEAD

## 1. Principle of Single Carrier Frequency Multiplexing System using a Single Tube.

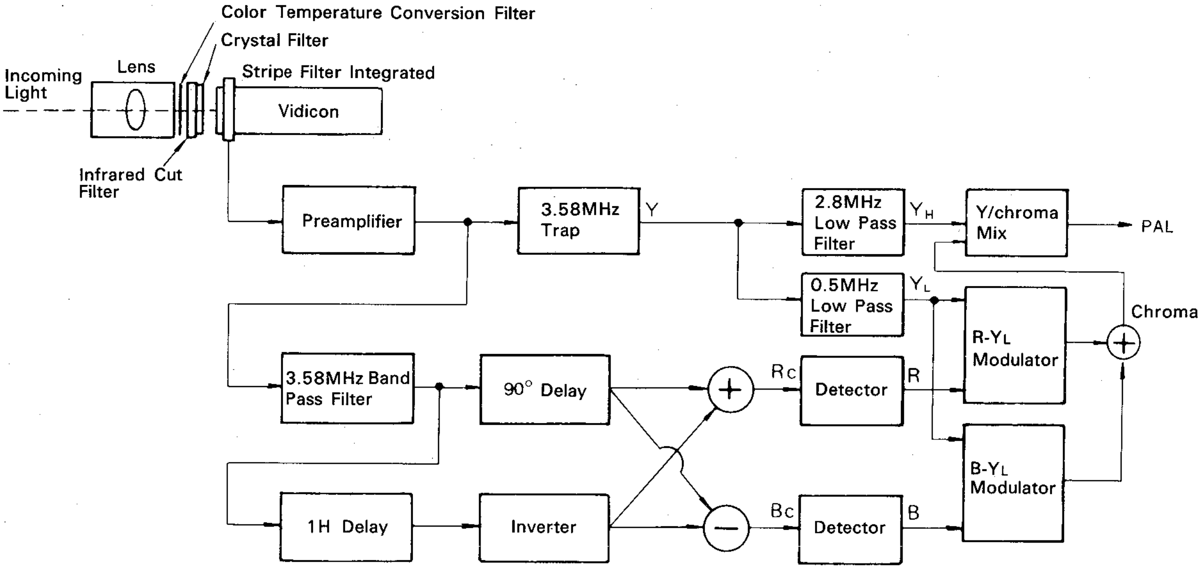

Color Temperature Conversion Filter
Crystal Filter
Stripe Filter Integrated
Incoming Light
Lens
Vidicon
Infrared Cut Filter
Preamplifier
3.58MHz Trap
Y
2.8MHz Low Pass Filter
YH
Y/chroma Mix
PAL
0.5MHz Low Pass Filter
YL
Chroma
R-YL Modulator
3.58MHz Band Pass Filter
90° Delay
Rc
Detector
R
B-YL Modulator
1H Delay
Inverter
Bc
Detector
B

Fig. 1-1 Principle of Single Carrier Frequency Multiplexing System using a Single Tube.

The incoming light to the camera which passes through the automatic iris control (AIC) lens, the color temperature conversion filter, the infrared (IR) cut filter and the crystal filter reaches the surface of the integrated stripe filter in a 2/3" vidicon (S4094P).

The diffusion filter is inserted between the AIC lens and the color temperature coversion filter when the white balance switch is set to CHECK position.

### Color Temperature Conversion Filter

Generally, the human eye is sensitive to electromagnetic waves from 380mμ (mμ=nm) to 780mμ in wavelength (the visible region). In addition, the human eye also discerns the wavelength difference as a color difference. The human eye responds to the light between 400mμ to 500mμ wavelength as predominantly blue information, the light between 500mμ to 600mμ as green information, and the light between 600mμ to 700mμ as red information. The entire light in the "visible" range of wavelength from 380mμ to 780mμ is "seen" as different amount of white light.

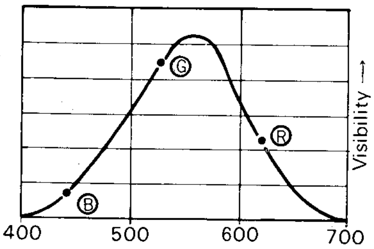


Fig. 1-2 Standard Luminosity Curve

When a carbon is burned, it emits light of a different quality depending on how hot it is. Various natural light can be expressed in terms of a color temperature which may be refered to a light emitted from the burning carbon used as a standard. A light source of 3200°K (K=Kelvin: −273°C corresponds to 0°K an absolute temperature) color temperature, which is used in studios, implies that its quality (color) is the same as that emitted from the carbon burning at 3200°K (2927°C). The relationship between the color temperature of light sources used for illumination and weather conditions are shown in Fig. 1-4. The color temperature goes up as the weather turns overcast from clear. This may be related to the burning carbon (charcoal) as follows. When the charcoal is heated and begins to glow (at low temperature), it emits a reddish light. But when it is so-called white hot (at high temperature), a bluish light is emitted. In other words, the light at a low color temperature is considered reddish and at high color temperature is considered bluish.

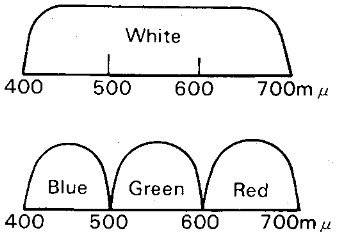

White
400
500
600
700mμ
Blue
Green
Red
400
500
600
700mμ

Fig. 1-3 The Visible Spectrum

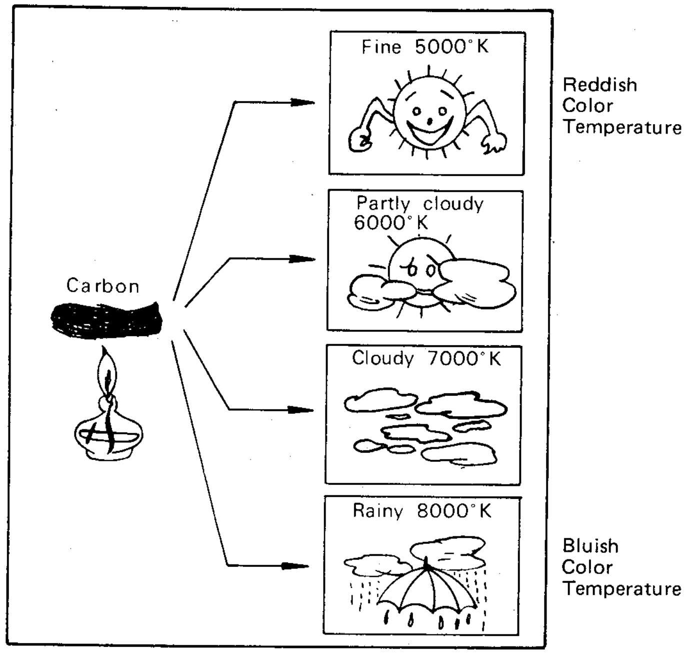


Fig. 1-4 Color Temperature and Weather Conditions

When a color camera is pointed at an object illuminated by a light of low color temperature, it reproduces a reddish picture.

When a color camera is pointed at an object illuminated by a light of high color temperature; it reproduces a bluish picture. The color camera has the indoor-outdoor selection switch which corrects for the color temperature of the light. When the switch is set to the outdoor position, the 5500°K COLOR TEMPERATURE CONVERSION FILTER is inserted into the light path to convert the color temperature from 5500°K to 3200°K. In addition to the indoor-outdoor selection switch utilizing the color temperature conversion filter, this camera is designed so that the level of red and blue signals can be changed independently to meet the color temperature of the light source in order to ensure proper color reproduction.

### Infrared Cut Filter

As shown in Fig. 1-5, the vidicon has some sensitivity in the infrared region beyond the visible range. The infrared(IR) cut filter cuts off the infrared light rays which the human eye does not see as light. If the color signal is made by using the video signal corresponding to the infrared rays which the human eye can not normally see, the color of pictures on the monitor and that seen with the naked eye would differ substantially.

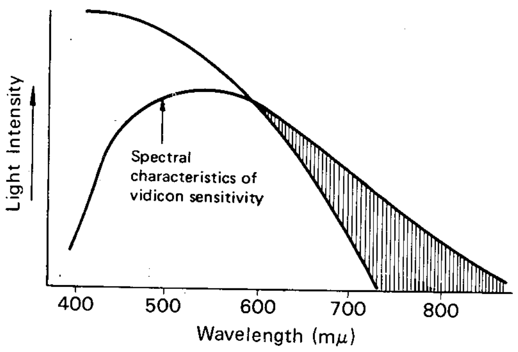


Fig. 1-5 IR Cut Filter Response

### Crystal Filter

As described later, since the red and blue images are modulated by the fine stripe filter built into the vidicon, false signals could develop due to interference between the stripe filters and fine detail objects. The crystal filter is an optical low pass filter which prevents the occurrence of such false signals by blocking the high frequency components of images.

### Diffusion Filter

When the white balance switch is set to CHECK position, the diffusion filter is inserted between the AIC lens and the color temperature conversion filter to diffuse the incoming light, and the whitish light reaches the vidicon.

### Vidicon

Different from that of the black-and white camera, the vidicon used in this color camera has a built-in stripe filter, a metallic strip called the optical black(OB) located on the face-plate. The video signal's black level is set in reference to the signal from the optical black.

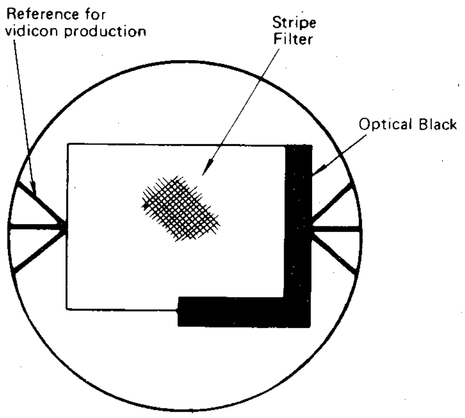


Fig. 1-6 Front View of S4094P Vidicon

As shown in Fig. 1-9 Ⓑ, the stripe filter integrated into the vidicon consists of a cyan/transparent stripe filter section and a yellow/transparent stripe filter section. These stripe filters are so arranged as to be of the same pitch in the horizontal scanning direction, and have equal angles with respect to the vertical. The vidicon's even and odd scanning lines pass the tracks of the stripe filters that are arranged in the same way. In other words, the even and odd scanning lines are spaced "a" apart.

For easy understanding, let's assume that light of uniform level containing green(G), red(R), and blue(B) reaches the vidicon (Fig. 1-9 Ⓐ ), and that the cross-point of cyan and yellow stripe filter is scanned as shown in Fig. 1-9 Ⓑ

Let's consider the light output from the stripe filter. The cyan filter cuts off the red(R) light which is complementary to it, and the yellow filter cuts off the blue(B) light which is complementary to it. (Fig. 1-7).

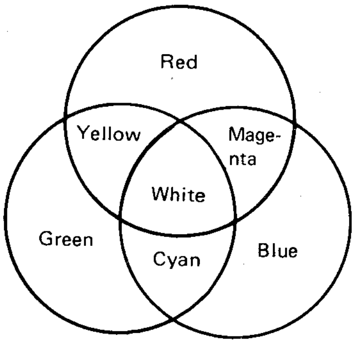


Fig. 1-7 Complementary Color

The light output Ⓒ, which corresponds to the Nth scanning line containes the modulated R and B components, riding on top of unmodulated G component.

The light output Ⓓ, which corresponds to the N+1st scanning line contains the modulated R and B components, riding on top of the unmodulated G component. Light output Ⓔ, Ⓕ, and Ⓖ correspond to N+2nd, N+3rd and N+4th scanning lines respectively. The light Ⓒ for the Nth line and the light Ⓖ for the N+4th line are exactly same.

The stripe filters have the same pitch in the horizontal scanning direction, and the same angle in the vertical directions so that there is a phase difference of 90° among modulated components.

The vidicon produces the video signal whose waveform is the same as that of the light which comes from the stripe filter.

The modulation frequency for the R and B signals can be calculated from the following equation.

$$f = \frac{w \times 10^3}{p \times t} \quad \text{(MHz)}$$

Here, f: Modulation frequency (MHz)

w: Horizontal width of effective scanning area of vidicon (mm)

p: Stripe filter pitch ($\mu$m)

t: Horizontal video signal duration [line duration (1H)–horizontal blanking duration (H. BL)] ($\mu$s)

Specifically;

$w = 7.45$ mm

$p = 40.2\ \mu$m

$t = 1H - H.BL = 64 - 12.25 = 51.75\ \mu s$

$$f = \frac{w \times 10^3}{p \times t} = \frac{7.45 \times 10^3}{40.2 \times 51.75} \fallingdotseq 3.58 \text{ MHz}$$

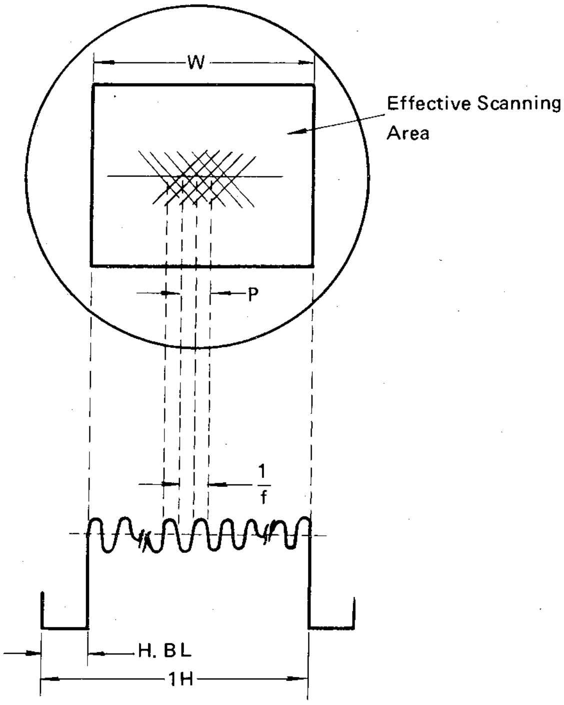


Fig. 1-8 Modulation Frequency

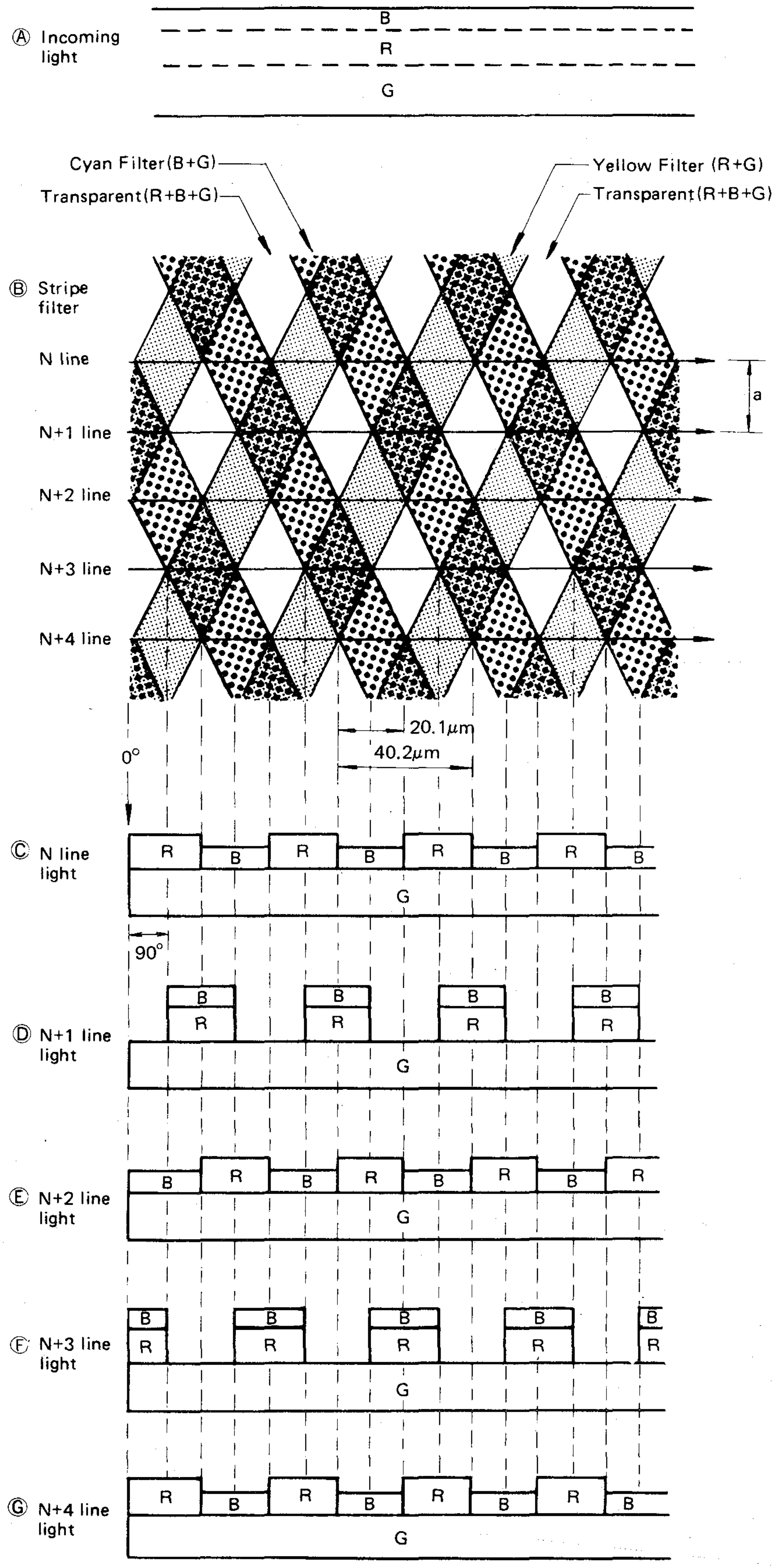

Ⓐ Incoming light
B
R
G
Cyan Filter(B+G)
Transparent(R+B+G)
Yellow Filter (R+G)
Transparent(R+B+G)
Ⓑ Stripe filter
N line
N+1 line
N+2 line
N+3 line
N+4 line
a
20.1μm
40.2μm
0°
Ⓒ N line light
R
B
G
90°
Ⓓ N+1 line light
B
R
G
Ⓔ N+2 line light
B
R
G
Ⓕ N+3 line light
B
R
G
Ⓖ N+4 line light
R
B
G

Fig. 1-9 Light from Stripe Filter

The incoming light is thus covnerted by the integrated stripe filter into a signal which contains R and B signals modulated by 3.58 MHz, and the G signal.

This signal is sent to the preamplifier, where it is amplified. The amplified signal Ⓗ (see Fig. 1-11) from preamplifier is sent to the 3.58 MHz trap circuit, which passes only the luminance (Y) signal Ⓘ comprising the G signal and the mean value of the modulated R and B signals. The mean value of modulated R and B signals on adjacent scanning lines are equal so that the luminance signal corresponding to two successive lines is also equal (see Fig. 1-10) due to the characteristics of the trap circuit.

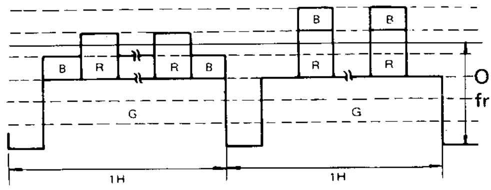

B
R
R
B
B
R
R
B
G
G
Output signal level from trap circuit
1H
1H

Fig. 1-10 Detection of Y signal

The Y signal thus obtained is supplied to the 2.8MHz low pass filter and the 0.5MHz low pass filter. The luminance ($Y_H$) signal having high frequency response and the luminance signal ($Y_L$) having low frequency response come out from these low pass filters.

The $Y_H$ signal is supplied to the Y/chroma mix circuit and the $Y_L$ signal to the R-$Y_L$ and B-$Y_L$ modulator circuits.

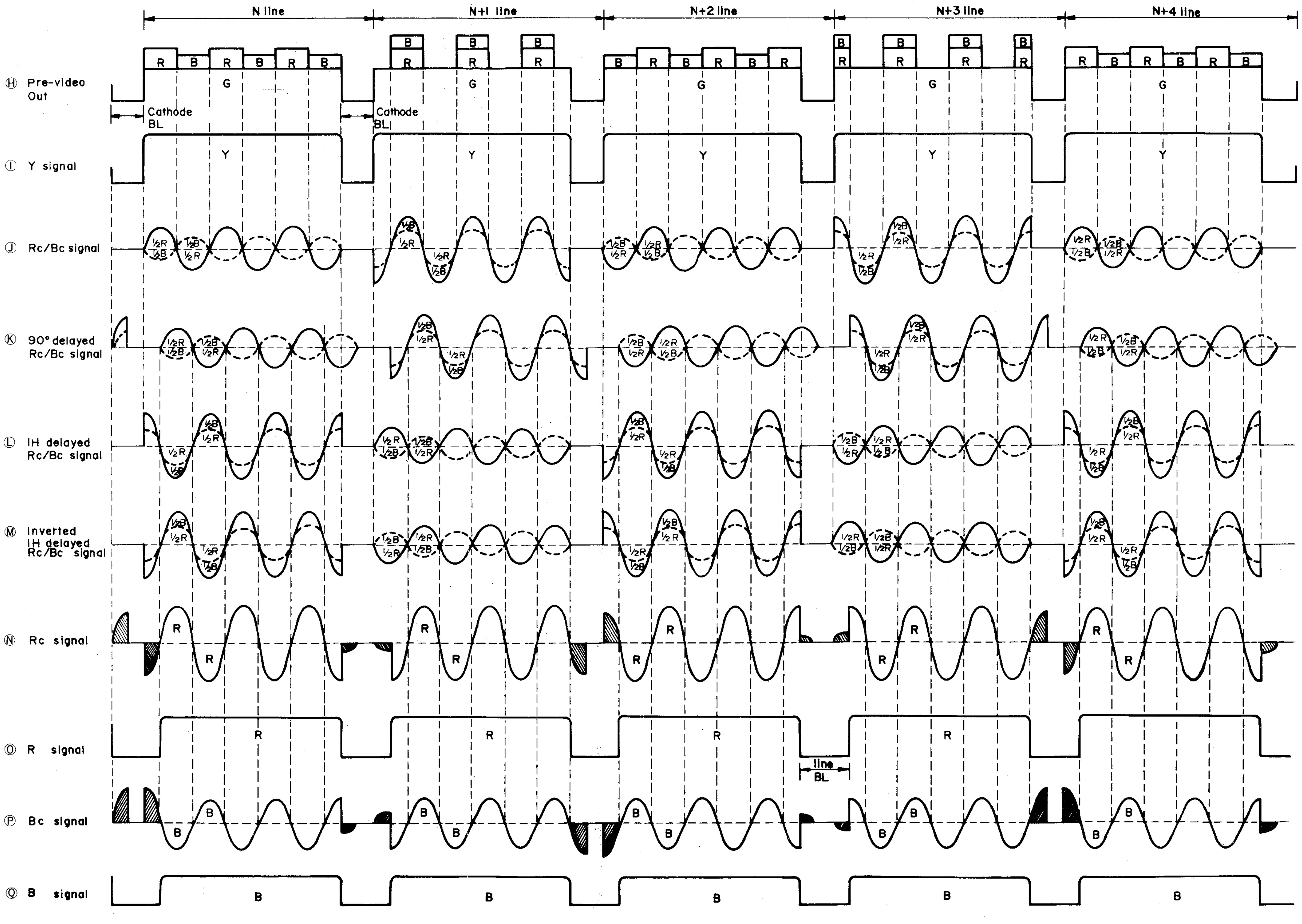
The amplified signal Ⓗ is also supplied to the band-pass-filter (B.P.F.) whose center frequency is 3.58 MHz and through which only the 3.58 MHz modulated signal Ⓙ passes.

The modulated signal Ⓙ is sent to the 90° phase shift circuit and the 1H (1 line) delay circuit, from which 90° phase shifted and 1H delayed modulated signals Ⓚ and Ⓛ are obtained.

The 1H-delayed modulated signal Ⓛ is inverted and the signal Ⓜ is obtained. The modulated R(Rc) signal Ⓝ is obtained by adding the modulated signals Ⓚ and Ⓜ and the modulated B(Bc) signal Ⓟ is obtained by subtraction of the modulated signals Ⓚ and Ⓜ. The shaded portions on the signals Ⓝ and Ⓟ are removed by mixing the line blanking pulse.

The Rc and Bc signals obtained by addition and subtraction are supplied to detectors, from which R signal Ⓞ and B signal Ⓠ are obtained. The R signal and B signal thus obtained are fed to the R-$Y_L$ and B-$Y_L$ modulator circuits respectively.

The chrominance signal obtained by mixing the R-$Y_L$ and B-$Y_L$ modulated signals is supplied to the Y/chroma mix circuit where it is mixed with the luminance ($Y_H$) signal to result in a PAL signal.


N line
N+1 line
N+2 line
N+3 line
N+4 line
Ⓗ Pre-video Out
Cathode BL
Cathode BL
R
B
G
Ⓘ Y signal
Y
Ⓙ Rc/Bc signal
Ⓚ 90° delayed Rc/Bc signal
Ⓛ 1H delayed Rc/Bc signal
Ⓜ Inverted 1H delayed Rc/Bc signal
½R
½B
Ⓝ Rc signal
Ⓞ R signal
line BL
Ⓟ Bc signal
Ⓠ B signal

*Shaded portions are removed by mixing the line blanking pulse.

Fig. 1-11 Detection of Y, R and B Signals

## 2. Preamplifier Circuit Board (YWV3030ZK05)

### Outline

This circuit amplifies the video current $I_S$ (0.2$\mu$A-0.3$\mu$A) from the vidicon.

The amplified video signal is delivered to the AGC & tracking signal generator circuit on the Process circuit board.

The preamplifier is a low output impedance and negative feedback amplifier which uses a low noise FET at the input.

To maintain the low noise in the signal, a so-called Percival circuit is used. It improves the S/N ratio at relatively high frequencies (where color components are located).

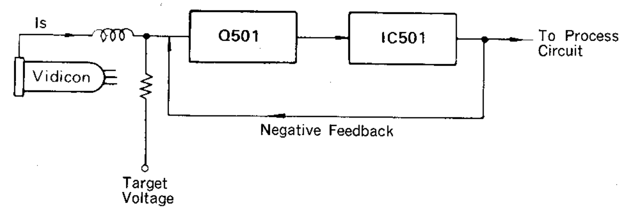

Is
Vidicon
Q501
IC501
To Process Circuit
Negative Feedback
Target Voltage

Fig. 2-1 Preamplifier

### Details

The signal current from the vidicon, comprising the modulated red(R) and blue(B) components, and the green(G) component, is supplied to the target terminal of the preamplifier circuit and converted to the video signal by R503 through L501 Percival coil. This video signal is amplified approx. 30dB by the amplifier which consists of Q501 FET and Q5001 inside IC501. The amplified signal is then fed to Q5002 and Q5003 which amplify the input signal approx. 66dB.

The signal at the collector of Q5003 inside IC501 is negatively fed back to the gate of Q501 through a feedback circuit which consists of R5013, R5014, C507 and C508.

The VC501 (FREQUENCY RESPONSE ADJUST) adjusts the frequency response of the feedback signal and corrects the frequency response of video signal.

The video signal whose frequency response is shaped by the negative feedback is converted to the low impedance video signal with the use of a buffer Q5004 inside IC501. It is then supplied to the Process circuit board. (YWV3030ZK02).

The target voltage for the vidicon is supplied from the Deflection circuit board to terminal No. 4 (Target voltage in) of the multi-pin connector CN206. The target voltage, controlled due to the vidicon temperature drift, is supplied to the vidicon target through R502, R501 and L501.

### Percival Circuit

The vidicon's output is a low noise signal, so that the video S/N is determined by the noise of the preamplifier. The S/N of the modulated R and B signal is lower than the S/N of the non-modulated signal in the low frequency range due to effects of the vidicon output capacitance and the input capacitance of the preamplifier.

Percival circuit is adopted to reduce the effects of these capacitances and improve the S/N.

The beneficial effects of the Percival circuit are shown in Fig. 2-2. The equivalent circuit is also shown in Fig. 2-3.

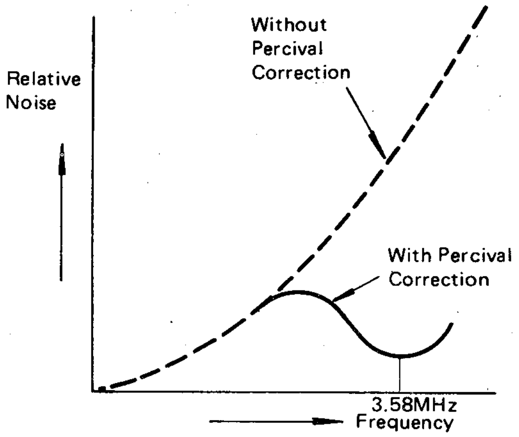
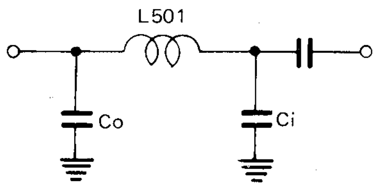


Fig. 2-2 Percival Correction



Where: L501; Percival coil
Co ; Output capacitance of vidicon
Ci ; Input capacitance of pre-amp.

Fig. 2-3

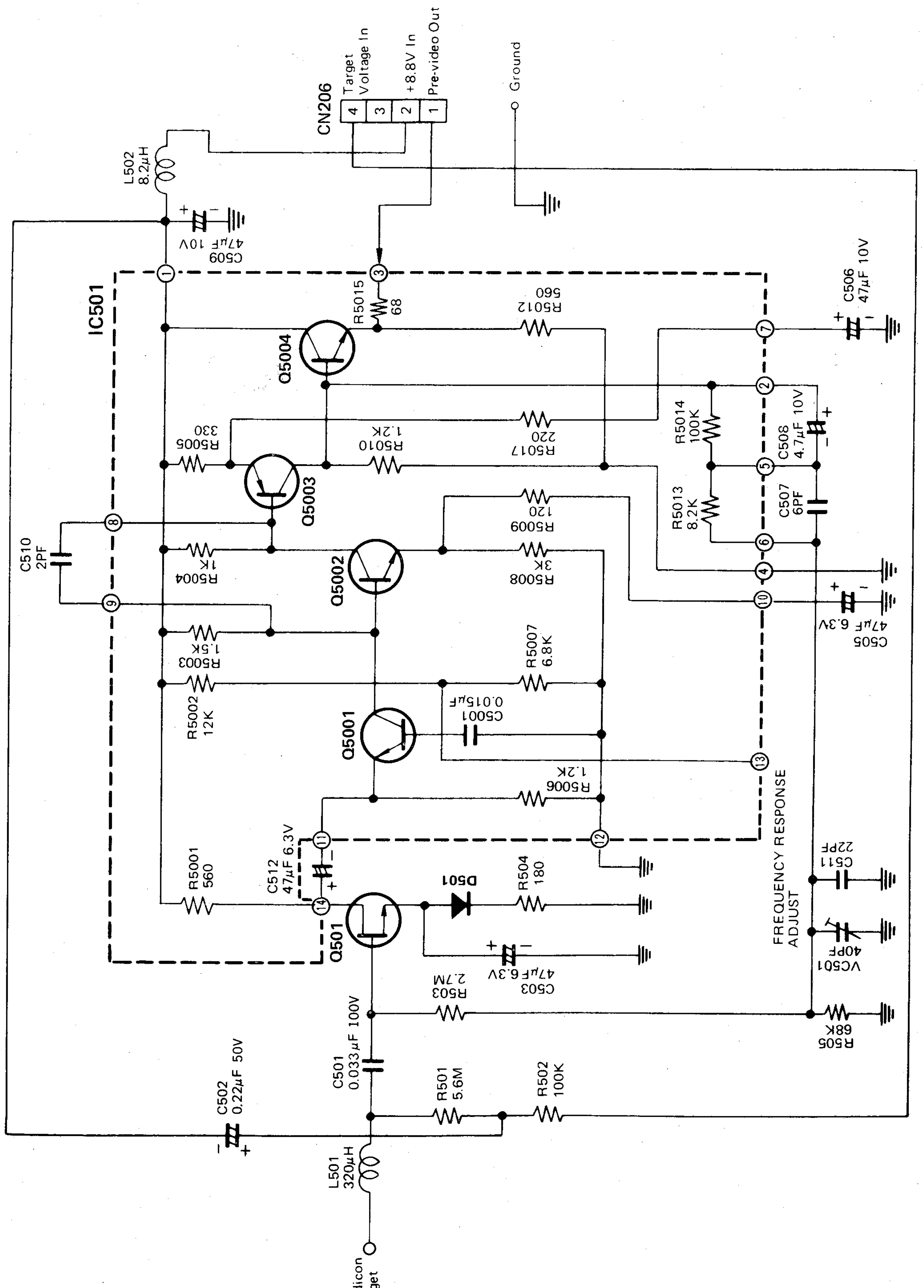

CN206
Target Voltage In
+8.8V In
Pre-video Out
Ground
L502 8.2μH
C509 47μF 10V
IC501
R5015 68
Q5004
R5012 560
C506 47μF 10V
R5005 330
Q5003
R5010 1.2K
R5017 220
R5014 100K
C508 4.7μF 10V
R5013 8.2K
C507 6PF
C510 2PF
R5009 120
R5004 1K
Q5002
R5008 3K
C505 47μF 6.3V
R5003 1.5K
R5007 6.8K
R5002 12K
Q5001
C5001 0.015μF
R5006 1.2K
FREQUENCY RESPONSE ADJUST
R5001 560
C512 47μF 6.3V
D501
R504 180
C511 22PF
VC501 40PF
Q501
C503 47μF 6.3V
R503 2.7M
R505 68K
C501 0.033μF 100V
C502 0.22μF 50V
R501 5.6M
R502 100K
L501 320μH
Vidicon target

Fig. 2-4 Preamplifier

## 3. Deflection Circuit Board (YWV3030ZK99)

The Deflection Circuit Board (YWV3030ZK99) contains following circuits.

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### 3-1. +9V Regulator Circuit

Outline

This circuit produces a regulated +9V power from the 12V power supplied from the portable VTR or power supply.

Details

The +12V power from the portable VTR or power supply is applied through terminal No. 10 of VTR connector, terminal No. 6 of CN104 and F101 to the emitter of Q301 mounted on the chassis.

A voltage regulator in IC103 amplifies the error between the reference and the potential set by VR108 (+9V ADJ) and forwards it to Q301 base. If the Q301 collector potential changes, the potential set by VR108 also changes, and a voltage change appears at the output of the voltage regulator.

This change controls the base current of Q301 in the direction which opposes the voltage change at Q301 collector.

As a result, the output voltage remains constant. VR108 is adjusted for 9V. D301 is the power indicator LED on the rear panel.

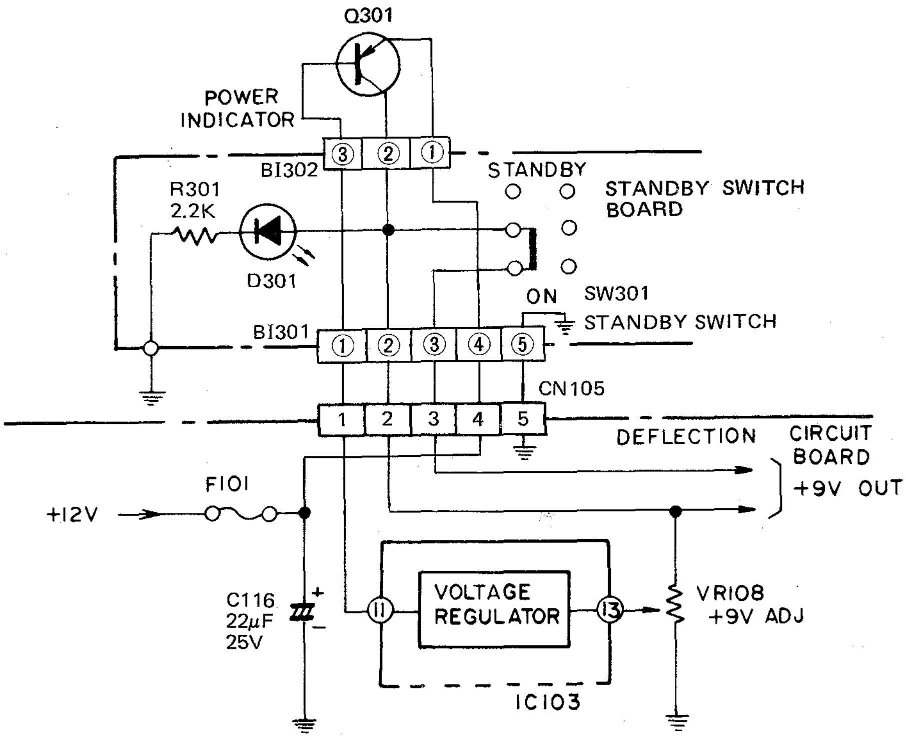

Q301
POWER INDICATOR
BI302
③ ② ①
STANDBY
STANDBY SWITCH BOARD
R301 2.2K
D301
ON
SW301
STANDBY SWITCH
BI301
① ② ③ ④ ⑤
CN105
1 2 3 4 5
DEFLECTION CIRCUIT BOARD
+9V OUT
F101
+12V
C116 22μF 25V
⑪
VOLTAGE REGULATOR
⑬
VR108 +9V ADJ
IC103

Fig. 3-1 +9V Regulator Circuit

### 3-2. +6V/+4.5V Regulator Circuit

Outline

+6V and +4.5V are generated by regulating the +9V generated in the +9V regulator circuit. They are used as sub-power supply for other circuits.

Details

The +6V power is generated by regulating the +9V power supply using IC104 (1/2). The output voltage of IC104 (pin 1) is applied to pin 2 of IC104 to form a feedback loop, and thus stabilizing the voltage. The reference voltage is obtained by dividing the +9V using R122 and R123.

The +4.5V is generated by regulating the +9V power supply using another IC104 (1/2). The output voltage of IC104 (pin 7) is applied to pin 6 of IC104 to form a feedback loop, and thus stabilizing the voltage. The reference voltage is obtained by dividing the +9V using R135 – R137.

### 3-3. Audio Amplifier Circuit

Outline

This circuit amplifies the output from the mounted microphone or external microphone, and sends out the amplified audio signal to the VTR for recording.

Details

The –72dB output from the electret condenser microphone (which is mounted on the camera), or an external microphone is amplified +52dB by IC101(1/2). The low-frequency response characteristic of the audio output is set by C104, C106, R1013 and its high-frequency response characteristic by C105.

The –20dB audio output is sent directly from pin 1 of IC101 to the portable VTR, or via power supply to the table model VTR through terminal No. 7 of VTR connector through terminal No. 8 of CN104.

### 3-4. Horizontal Sawtooth/Parabola Generator Circuit

Outline

This circuit generates the horizontal sawtooth and parabola waveforms needed in the dark shading correction circuit and dynamic focus correction circuit on the Deflection circuit board.

The horizontal sawtooth and parabola signals are also fed to the Process circuit board for shading correction.

Details

The horizontal scanning start pulse (Hs) from the Process circuit board enters the base of Q101 through terminal No. 2 of BI102. The Hs pulse is then fed to a miller integrator consisting of R105, C107 and IC101 (1/2) and converted into a sawtooth signal.

The H. sawtooth signal at pin 7 of IC101 is fed to the wiper arms of VR102 (H. SAWTOOTH) for the dark shading correction, VR103 (H. SAWTOOTH) for the dynamic focus correction and the Process circuit board through terminal No. 8 of BI102.

The H. sawtooth signal at pin 7 is also supplied to another miller integrator consisting of R1021 in block resistor BR102, C109 and IC102 (1/2) to convert it into a parabola signal.

The H. parabola signal obtained at pin 7 of IC102 is fed to the wiper arms of VR101 (H. PARABOLA) for the dark shading correction, VR104 (H. PARABOLA) for the dynamic focus correction and the Process circuit board through terminal No. 9 of BI102.

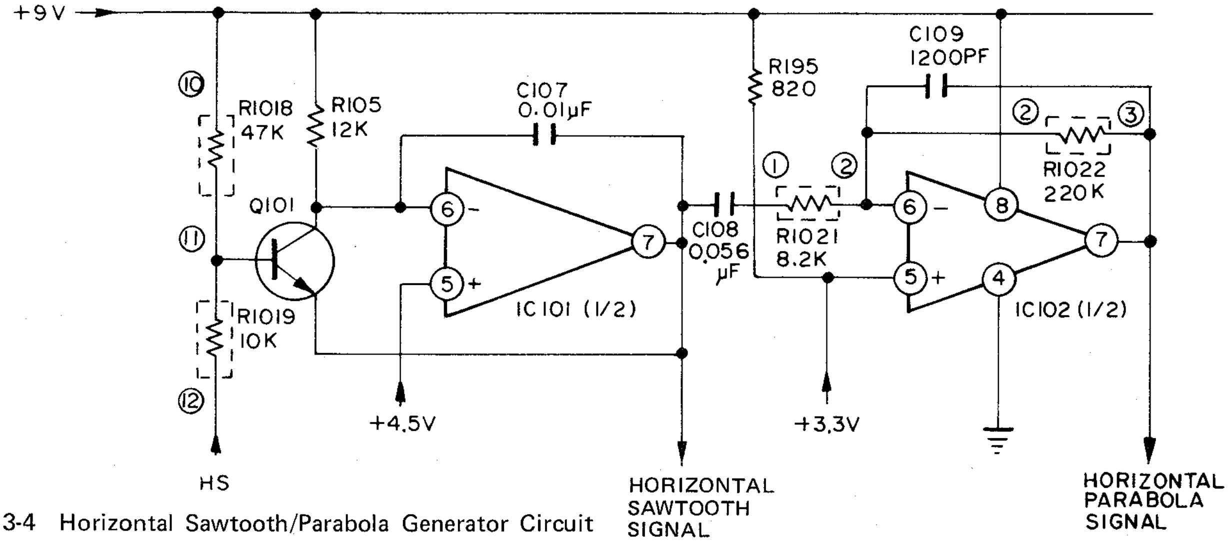


Fig. 3-4 Horizontal Sawtooth/Parabola Generator Circuit

## 3-5. Dark Shading Correction & Cathode Blanking Circuit

### Outline

The vidicon produces dark current when the light is blocked by capping the lens for example. The dark current is not uniform along the entire target structure, but has a "shading" Ⓐ.

As described in the section on the principle of single carrier frequency multiplexing, the red and blue signals are obtained by detecting the modulated signals from the preamplifier output using a band pass filter. Therefore, the red and blue signals are free from dark shading.

However, the luminance signal is obtained by removing the modulated signal using a trap circuit. Therefore, the luminance signal receives undesirable dark shading.

The dark shading correction circuit supplies horizontal sawtooth and parabola signals Ⓑ to the vidicon cathode (K) to correct color shading at low illumination levels.

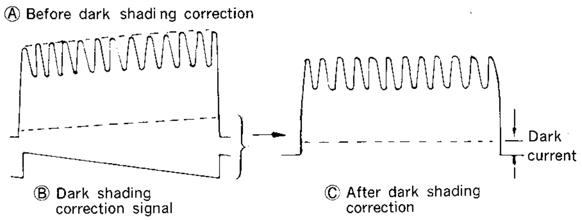

Ⓐ Before dark shading correction
Dark current
Ⓑ Dark shading correction signal
Ⓒ After dark shading correction

Fig. 3-5-1 Dark Shading Correction

This circuit also generates a cathode blanking pulse and supplies it to the vidicon cathode (K) together with the dark shading correction signal in order to eliminate the retrace scanning lines.

### Details

The horizontal sawtooth and parabola signals which are generated by the horizontal sawtooth/parabola generator are routed to the wiper arms of the dark shading correction controls VR102 (H. SAWTOOTH) and VR101 (H. PARABOLA).

These signals are applied to both the inverted (pin 2) and non-inverted input (pin 3) of IC102 (1/2), where they are amplified.

The output of IC102 at pin 1 produces a positive or negative dark shading correction signal which depends on the position of these controls.

The horizontal (H) flyback pulse at the collector of H. deflection output Q111 and the vertical scanning start (Vs) pulse from terminal No. 3 of BI102 are supplied to the base of Q102 respectively.

The mixed signal obtained at the collector of Q102 is fed to buffer Q104 through switching amplifier Q103 as a cathode blanking (BL) pulse and mixed with the dark shading correction signal supplied through D101.

The mixed signal at the emitter of Q104 is supplied to the cathode (K) of vidicon through terminal No. 4 of BI103.

## 3-6. Dynamic Focus Correction Circuit

### Outline

Generally, the focus voltage which brings the beam in focus in the center part of the pick-up tube is different in level from the voltage which brings the edge portions of the pick-up tube into best focus so that the modulation depth for the center part and the edge portions of the pick-up tube differ.

When the camera is directed at an evenly illuminated white object, the red and blue signals modulated at 3.58MHz do not have a uniform level, and as a result, a color shading appears. (Fig. 3-6-1 Ⓐ)

The dynamic focus correction circuit supplies horizontal (H) and vertical (V) sawtooth and parabola signals to the vidicon focus electrode (grid-4) together with the DC focus voltage from the high voltage circuit to focus the electron beam along the entire scanning area for correcting unevenness of modulation factor (Fig. 3-6-1 Ⓑ).

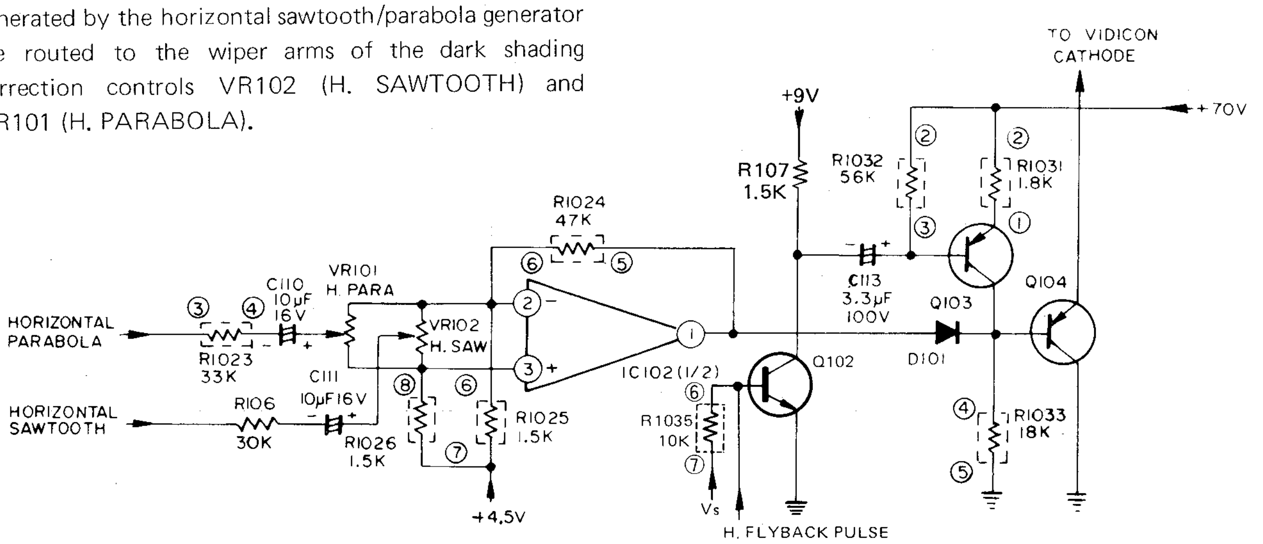

TO VIDICON CATHODE
+70V
+9V
R107 1.5K
R1032 56K
R1031 1.8K
②
②
③
①
R1024 47K
⑥
⑤
VR101 H. PARA
C110 10μF 16V
③
④
HORIZONTAL PARABOLA
R1023 33K
VR102 H. SAW
②
③
①
C113 3.3μF 100V
Q103
Q104
D101
Q102
IC102 (1/2)
HORIZONTAL SAWTOOTH
R106 30K
C111 10μF 16V
R1026 1.5K
⑧
⑥
R1025 1.5K
⑦
+4.5V
⑥
R1035 10K
⑦
Vs
H. FLYBACK PULSE
④
R1033 18K
⑤

Fig. 3-5-2 Dark Shading Correction & Cathode Blanking Circuit

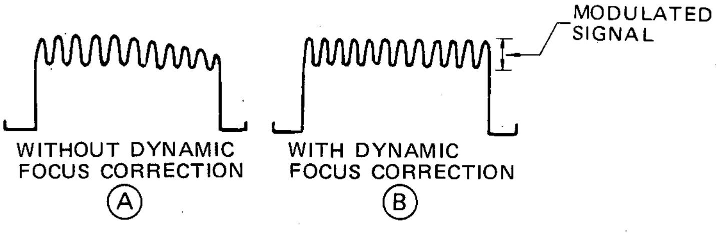

MODULATED SIGNAL
WITHOUT DYNAMIC FOCUS CORRECTION
Ⓐ
WITH DYNAMIC FOCUS CORRECTION
Ⓑ

Fig. 3-6-1 Dynamic Focus Correction

Details

The horizontal sawtooth signal from pin 7 of sawtooth generator IC101(1/2), the horizontal parabola signal from pin 7 of parabola generator IC102(1/2), the vertical sawtooth signal from pin 1 of vertical sawtooth/parabola generator IC106, and vertical parabola signal from pin 7 of IC106 to the wiper arms of dynamic focus correction control VR103 (H. SAWTOOTH), VR104 (H. PARABOLA), VR106 (V. SAWTOOTH) and VR105 (V. PARABOLA) respectively.

These waveforms are applied to both the base and emitter of Q105, where they are amplified. The collector of Q105 produces an inverted or non-inverted signal depending on the position of these controls.

The dynamic focus correction waveform at the collector of Q105 is AC coupled via C115 into vidicon grid-4 (G4) electrode which normally receives the DC voltage adjusted by VR120 (CAMERA FOCUS).

In this way, the electron beam is focused along the entire scanning area, and the unevenness of modulation is corrected.

Note: Dynamic focus should be adjusted when color non-uniformity is seen in the picture of a white card after dark shading is properly adjusted and after electrical focus and beam alignment are correctly set.

To judge whether the camera needs this adjustment, signal shading potentiometers VR208-VR211 (R. Shading Correction) and VR223-VR226 (B. Shading Correction) on the Process circuit board (YWV3030ZK02) must be at their mechanical centers.

Be aware that proper beam alignment has greater contribution to color uniformity than dynamic focus even though it is more difficult to achieve in a hurry.

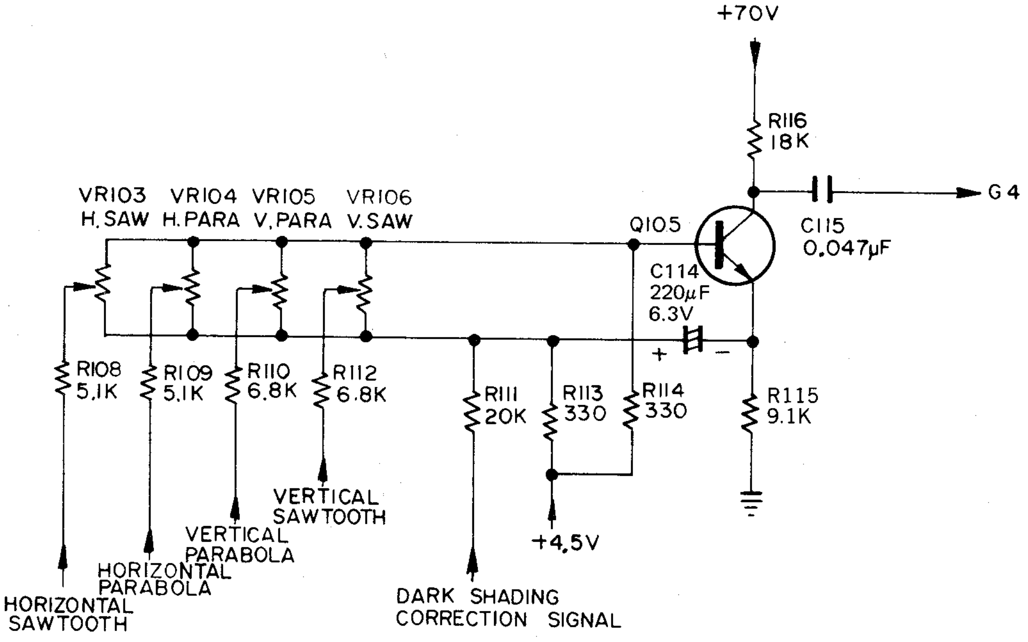

+70V
R116
18K
G4
C115
0.047μF
Q105
C114
220μF
6.3V
+
−
VR103
H.SAW
VR104
H.PARA
VR105
V.PARA
VR106
V.SAW
R108
5.1K
R109
5.1K
R110
6.8K
R112
6.8K
R111
20K
R113
330
R114
330
R115
9.1K
VERTICAL SAWTOOTH
VERTICAL PARABOLA
HORIZONTAL PARABOLA
HORIZONTAL SAWTOOTH
+4.5V
DARK SHADING CORRECTION SIGNAL

Fig. 3-6-2 Dynamic Focus Correction Circuit

## 3-7. VTR Remote Control Circuit

### Outline

This circuit generates VTR start/stop (pause) control signal.

When the VTR is set to the recording mode, the VTR is started by a high potential from this circuit. If a low potential is sent to the VTR, it stops (pauses). This circuit also has the VTR compatibility switch for other VTR which is started by a low potential and stopped by a high potential.

### Details

When the power switch is turned ON, the potential at pin 6 and pin 7 of IC103 is set to high and low respectively by a flip-flop circuit inside IC103. When the VTR is set to the recording mode and the VTR compatibility switch SW001 is set to the normal (+) position, the high potential at pin 6 is fed through terminal No. 1 of BI101, VTR compatibility SW001 and terminal No. 2 of BI101 to Q106 where it is inverted. The inverted low potential is supplied through terminal No. 1 of CN104 and terminal No. 6 of VTR connector CN003 to the VTR to stop (pause) it.

At the same time, the low potential at pin 7 turns OFF inverter Q116. Therefore, no current flows to the VTR recording indicator D401 in the electronic viewfinder connected to the collector of Q116 and it is turned OFF.

When the non-lock type VTR start/stop SW701 is depressed (refer to "FIRST TRIGGER" in Fig. 3-7-2), the negative trigger pulse is generated due to the time constant of R101 – R104 and C101. It is fed to the flip-flop, and causes the flip-flop to change its state. The low potential at pin 6 of IC103 is inverted to a high by Q106 and fed to the VTR to start recording. At the same time, the high potential at pin 7 of IC103 turns ON Q116 and the current flows to the VTR recording indicator D401 lights. When a subsequent trigger pulse is sent to the flip-flop by depressing SW701 again (refer to "SECOND TRIGGER" in Fig. 3-7-2), the flip-flop is inverted. As a result, the VTR is stopped and recording indicator goes OFF.

The VTR compatibility switch SW001 and inverter Q126 invert the potential of VTR start/stop control signal for other VTR which starts with a low potential and stops with a high potential.

When the VTR is set to the playback mode, an inhibit signal (high level) from the VTR is supplied to the base of Q108 to turn it ON setting the potential at pin 3 of IC103 to low so that the potential at pin 6 and pin 7 are forced high and low respectively. In this state, even if another trigger pulse is sent to the flip-flop by depressing SW701 again, the flip-flop remains set. Therefore, no current flows to the VTR recording indicator and no VTR recording control signal is sent to VTR from Q106. This condition is maintained until the playback mode is released and set to the recording mode again.

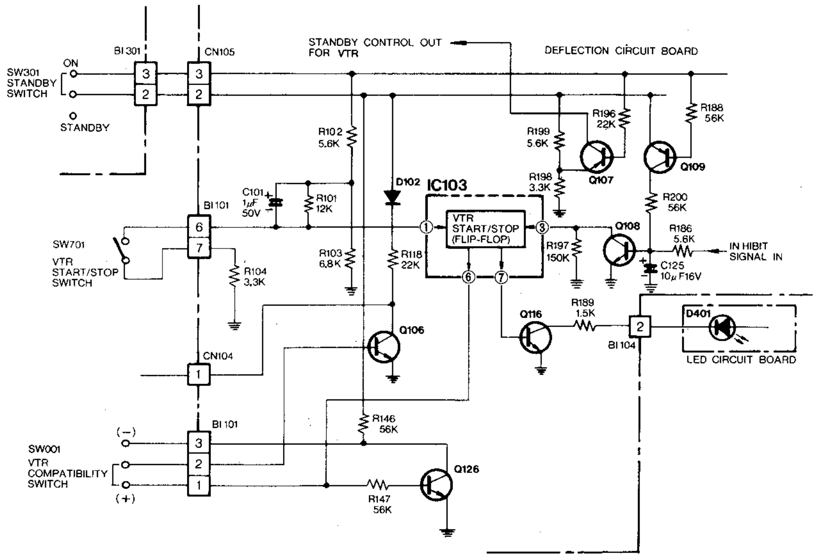

BI301
CN105
SW301
STANDBY
SWITCH
ON
STANDBY
STANDBY CONTROL OUT FOR VTR
DEFLECTION CIRCUIT BOARD
R102 5.6K
C101 1μF 50V
R101 12K
D102
IC103
VTR START/STOP (FLIP-FLOP)
R199 5.6K
R196 22K
R198 3.3K
Q107
Q109
R188 56K
R200 56K
Q108
R186 5.6K
IN HIBIT SIGNAL IN
C125 10μ F16V
R197 150K
BI101
SW701
VTR START/STOP SWITCH
R104 3.3K
R103 6.8K
R118 22K
Q106
Q116
R189 1.5K
BI104
D401
LED CIRCUIT BOARD
CN104
BI101
R146 56K
SW001
VTR COMPATIBILITY SWITCH
(−)
(+)
Q126
R147 56K

Fig. 3-7-1 VCR Remote Control Circuit

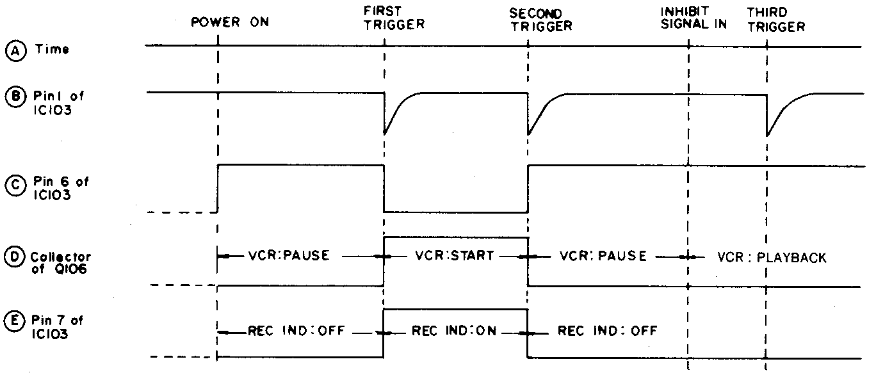


Fig. 3-7-2 Timing Chart

### 3-8. Standby Circuit

Outline

When recording outdoors, using camera and VTR, the power reserve of the batteries must be conserved as much as possible, which is the exact function of the standby circuit.

Details

When the standby switch SW301 is set to the "ON" position, practically all circuits in the camera and the VTR are operational, that is, the power from +9V source is supplied to all electric circuits in the Process and Deflection circuit boards in the camera and +12V is consumed in the VTR.

When the standby switch SW301 is set to the "STANDBY" position, the power from +9V source goes only to the +6V DC regulator in order to preheat the heater of vidicon tube and cathode ray tube(CRT). At the same time, Q107 turns ON and the VTR receives a standby signal(+3V) from the collector of Q107 to stop (stand-by) the operation of itself.

Since the +9V DC regulator circuit and the VTR remote control circuit are located in the same IC, the VTR remote control circuit also receives the +9V power in the standby mode. Therefore, the state of flip-flop is controlled by the operation of VTR start/stop switch SW701 and the VTR recording indicator D401 is turned ON/OFF in the standby mode. Q109 turns OFF D401 in the standby mode.

When the standby switch SW301 is set to STANDBY mode, Q109 turns ON causing Q108 ON and the potential at pin 3 of IC103 low. As a result, the potential at pin 6 and pin 7 are forced high and low respectively, and D401 goes OFF.

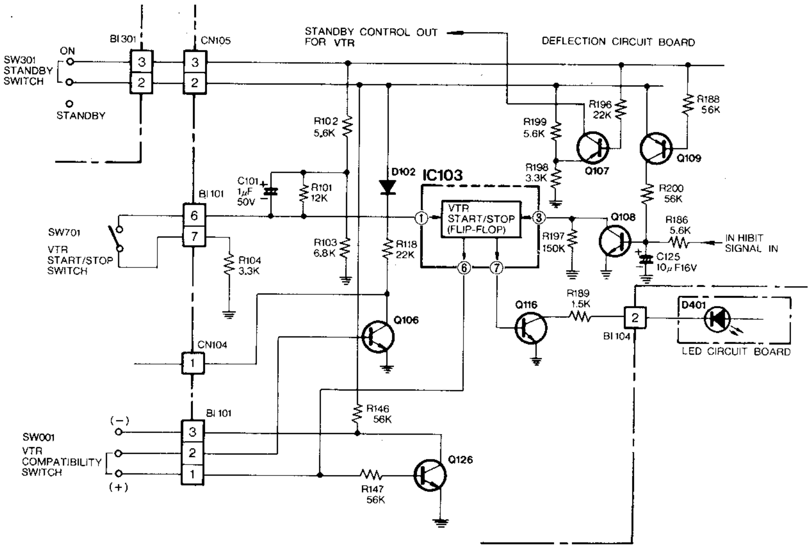

BI301
CN105
STANDBY CONTROL OUT FOR VTR
DEFLECTION CIRCUIT BOARD
SW301 STANDBY SWITCH
ON
STANDBY
R102 5.6K
R196 22K
R188 56K
R199 5.6K
Q107
Q109
R198 3.3K
D102
IC103
C101 1μF 50V
R101 12K
BI101
R200 56K
VTR START/STOP (FLIP-FLOP)
Q108
R186 5.6K
IN HIBIT SIGNAL IN
SW701 VTR START/STOP SWITCH
R103 6.8K
R118 22K
R197 150K
C125 10μ F16V
R104 3.3K
R189 1.5K
Q116
D401
BI104
LED CIRCUIT BOARD
Q106
CN104
R146 56K
SW001 VTR COMPATIBILITY SWITCH
(−)
(+)
Q126
R147 56K

Fig. 3-8-1 Standby Circuit-1

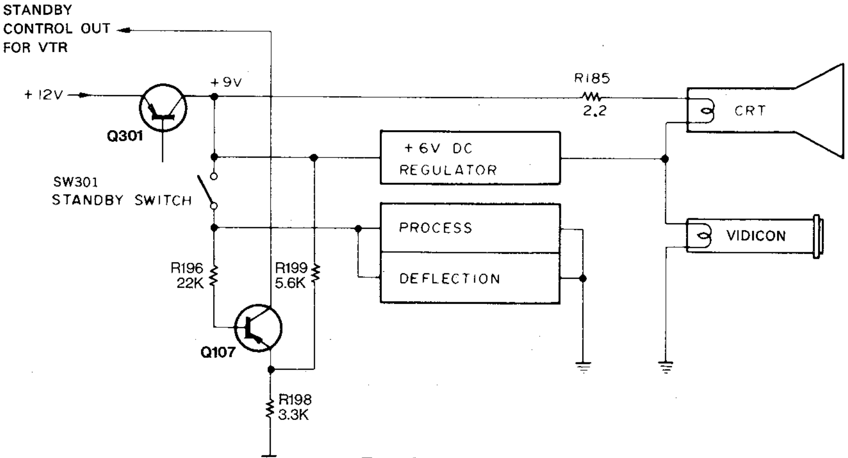

STANDBY CONTROL OUT FOR VTR
+12V
+9V
Q301
R185 2.2
CRT
+6V DC REGULATOR
SW301 STANDBY SWITCH
PROCESS
VIDICON
DEFLECTION
R196 22K
R199 5.6K
Q107
R198 3.3K

Fig. 3-8-2 Standby Circuit-2

### 3-9. Horizontal Deflection Circuit

Outline

This circuit generates the sawtooth current for the horizontal (H) beam deflection inside the vidicon, supplying it to the horizontal deflection coil.

Details

The horizontal scanning start(Hs) pulse supplied from the Process circuit board (YWV3030ZK02) goes via inverter Q110 to horizontal deflection output Q111. When Q111 is switched by the Hs pulse from Q110, the collector current pulse of Q111 resonates with L102 and C133, and the resultant horizontal sawtooth current is supplied to the horizontal deflection coil through pin 1 of CN107. VR109 (CAMERA H. SIZE) is a control for adjusting the horizontal scanning size.

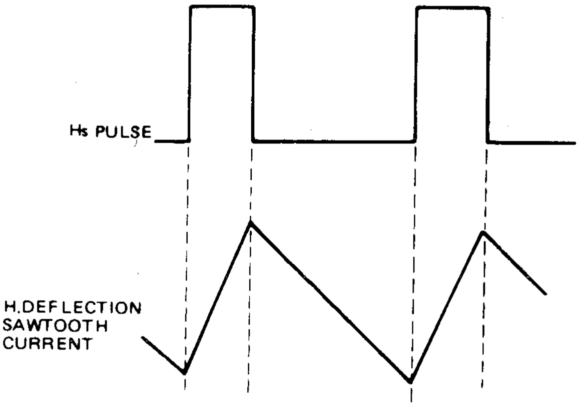


Fig. 3-9-1 Horizontal Deflection

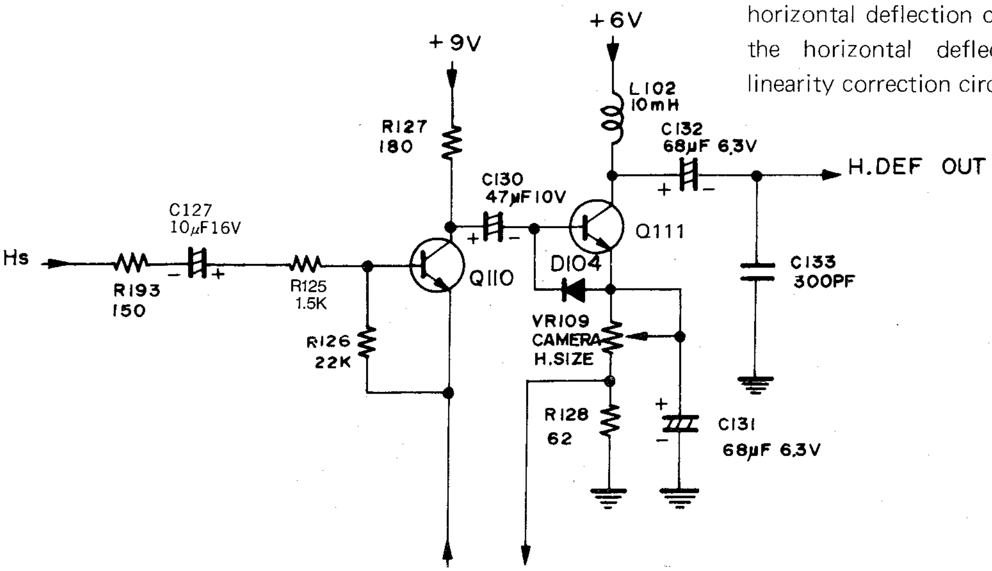


Fig. 3-9-2 Horizontal Deflection Circuit

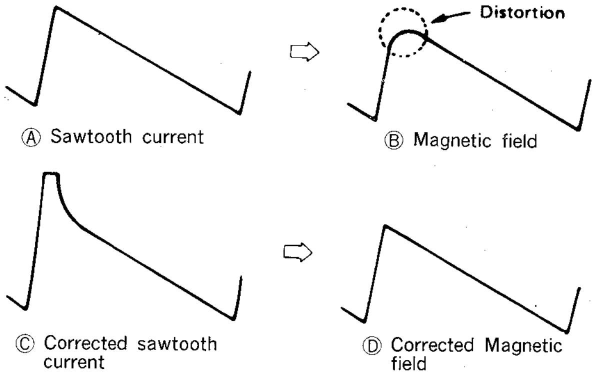
### 3-10. Horizontal Linearity Correction Circuit

Outline

The horizontal (H) deflection circuit is of a switching type, so that the generated sawtooth current waveform has poor linearity. By feeding the sawtooth current to the deflection coil, the intensity of the magnetic field generated in the deflection coil is not linear as the vidicon's electron beam is deflected.

If a linear sawtooth current Ⓐ is sent to the deflection coil, however, the magnetic field in the scanning start portion is distorted Ⓑ due to the effect of the vidicon's electrodes, coil hysterisis, etc. As a result, the linearity of the scanning start portion deteriorates, and a shading (unevenness of amplitude) appears on the left edge of the picture.

Therefore, in order to generate a linear magnetic field intensity Ⓓ and to correct the linearity and shading of the scanning start portion, it is necessary to feed a nonlinear sawtooth signal Ⓒ to the deflection coil.



Ⓐ Sawtooth current
Ⓑ Magnetic field
Ⓒ Corrected sawtooth current
Ⓓ Corrected Magnetic field

Fig. 3-10-1 Horizontal Linearity Correction-1

This circuit generates a waveform to "correct" the linearity of horizontal sawtooth current waveform and its starting portion. As shown in Fig. 3-10-2, the horizontal deflection circuit is connected to one end of the horizontal deflection coil, and the horizontal linearity correction circuit to the other end.

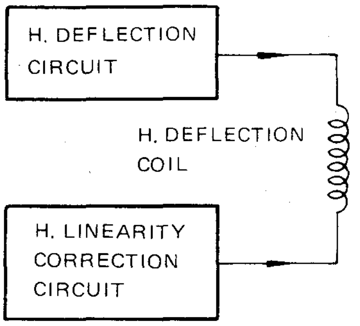

H. DEFLECTION CIRCUIT
H. DEFLECTION COIL
H. LINEARITY CORRECTION CIRCUIT

Fig. 3-10-2
Horizontal Linearity Correction-2

Details

The horizontal flyback pulse Ⓔ produced from the collector of Q111 in the horizontal(H) deflection circuit is integrated by L103 and R191 into a sawtooth signal Ⓕ.

This sawtooth signal is again integrated by L103, R133 and C136 into a parabola signal Ⓖ, which is applied to pin 6 of differential amplifier IC105(1/2) as a horizontal linearity correction signal.

The horizontal flyback pulse Ⓔ from Q111 is integrated by R132 and C134 into a linearity correction signal Ⓗ for correcting the linearity of the starting portion of the horizontal sawtooth current waveform. The starting portion linearity correction signal Ⓗ is applied to pin 5 of IC105 where the linearity correction signal Ⓖ and the starting portion linearity correction signal Ⓗ are mixed and amplified.

The mixed signal Ⓘ of these linearity correction signals at pin 7 of IC105 is fed to the horizontal deflection coil to correct the linearity of the horizontal sawtooth current waveform.

VR110 (H. LIN) is a control for adjusting the linearity of the starting portion. VR111(H. CENTERING) is a centering control which controls the positive input potential of IC105 to change the direct current flowing to the deflection coil, and thus sets the horizontal scanning position on the vidicon.

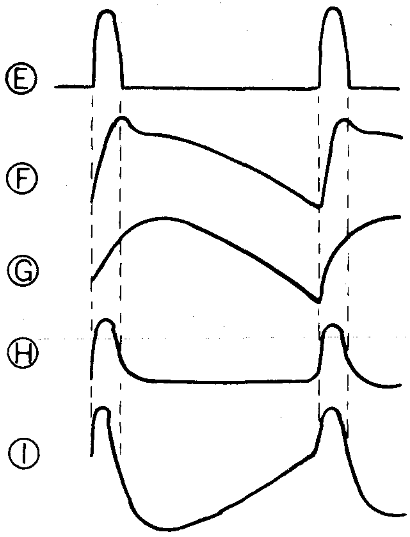


Fig. 3-10-3
Horizontal Linearity Correction-3

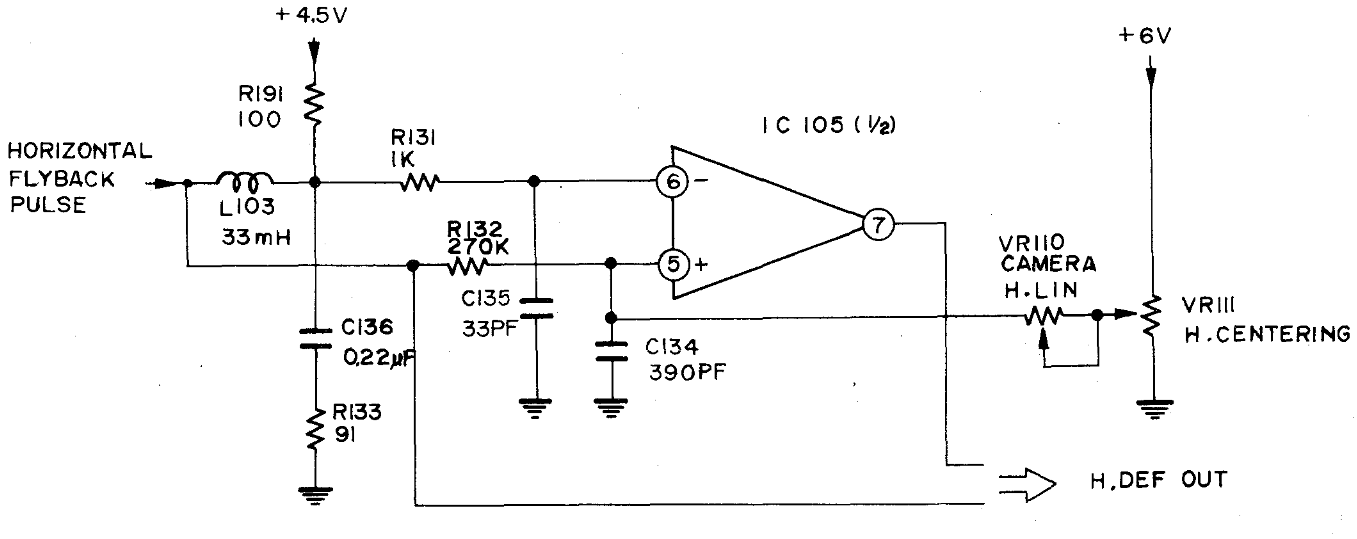

+4.5V
R191
100
HORIZONTAL FLYBACK PULSE
L103
33mH
R131
1K
R132
270K
C135
33PF
C136
0.22μF
R133
91
C134
390PF
IC 105 (1/2)
6
5
7
-
+
+6V
VR110
CAMERA
H.LIN
VR111
H.CENTERING
H.DEF OUT

Fig. 3-10-4 Horizontal Linearity Correction Circuit

## 3-11. Vertical Deflection Circuit

Outline

This circuit generates a sawtooth current for the vertical(V) beam deflection inside the vidicon, feeding it to the vertical deflection coil.

Details

The vertical scanning start(Vs) pulse sent from the Process circuit board (YWV3030ZK02) is fed to sawtooth generator Q112 which converts it into a vertical rate sawtooth.

This sawtooth signal is applied to pin 2 of the amplifier IC105(1/2), which produces an amplified vertical sawtooth signal from its output pin 1. This amplified signal is sent to the vertical deflection coil. The sawtooth current flowing to the vertical deflection coil is detected by R141 which is connected in series with the deflection coil, and fed back to sawtooth generator Q112, thus correcting the linearity of the vertical sawtooth waveform. Therefore, a linear sawtooth current flows in the vertical deflection coil.

The vertical sawtooth signal detected by R141 is applied through R1055 to the vertical sawtooth/parabola generator circuit IC106.

VR112(V.SIZE) is the control for changing the amplitude of the vertical deflection sawtooth waveform to set vertical scanning size. VR113(V.CENTERING) is a centering control which controls the direct current flowing to the vertical deflection coil to set the vertical scanning position on the vidicon.

## 3-12. Vertical Sawtooth/Parabola Generator Circuit

Outline

This circuit generates the vertical sawtooth and parabola waveforms needed in the dynamic focus correction circuit on the Deflection circuit board. The vertical sawtooth and parabola signals are also fed to the Process circuit board for shading correction of red and blue signals.

Details

The vertical(V) deflection sawtooth signal generated in the vertical deflection circuit is fed to pin 3 of IC106 where it is amplified. The amplified V.sawtooth signal at pin 1 of IC106 is supplied to the miller integrator consisting of IC106(1/2), R1051 in BR105, R149, C144 and C145, and converted into a V.parabola signal. The V. sawtooth signal and V.parabola signal at pin 1 and pin 7 of IC106 are applied respectively to the wiper arms of VR106 (V.SAWTOOTH) and VR105 (V. PARABOLA) in the dynamic focus correction circuit, and the Process circuit board through terminal No. 11 and No. 10 of BI102 for the shading correction of red and blue signals.

The V.sawtooth signal is also supplied to the target protection circuit.

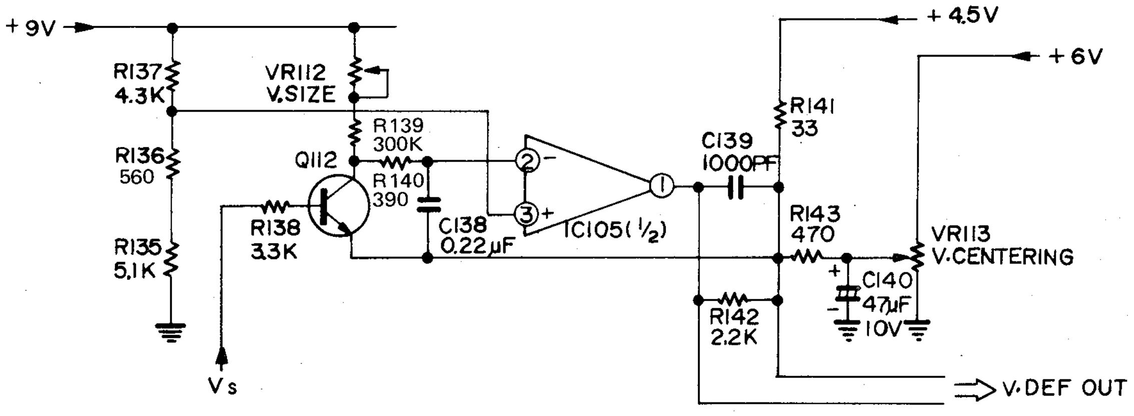


Fig. 3-11 Vertical Deflection Circuit

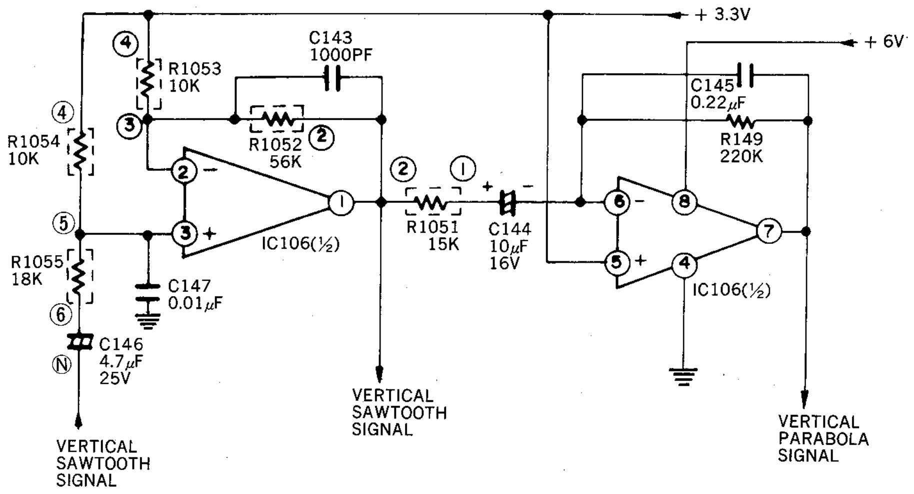

+ 3.3V
+ 6V
④
R1053
10K
C143
1000PF
③
R1052
56K
②
R1054
10K
⑤
R1055
18K
⑥
C147
0.01μF
C146
4.7μF
25V
Ⓝ
IC106(½)
R1051
15K
C144
10μF
16V
C145
0.22μF
R149
220K
IC106(½)
VERTICAL SAWTOOTH SIGNAL
VERTICAL SAWTOOTH SIGNAL
VERTICAL PARABOLA SIGNAL

Fig. 3-12 Vertical Sawtooth/Parabola Generator Circuit

## 3-13. Target Voltage Control Circuit

### Outline

The pick-up tube gives out an output signal which corresponds to the incoming light intensity. Even when no light reaches the tube, an output signal, called dark current is produced. The vidicon's dark current is relatively large and varies according to the vidicon temperature so that the black level of the output signal tends to drift causing color shift.

The target voltage control circuit detects the vidicon's temperature variation, and controls the target voltage according to the temperature drift, and thus reduces dark current variations.

This circuit, and the optical black clamp circuit minimize the black level variations.

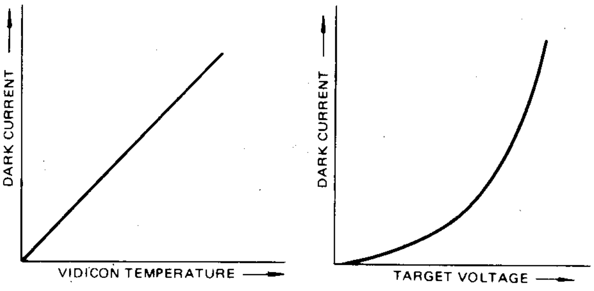


Fig. 3-13-1 Characteristic of Vidicon

### Details

The deflection coil assembly has a built-in temperature detecting thermistor which is connected between terminal 6 of the multi-pin connector CN107 and ground. When the inside temperature of the coil assembly changes(it also changes in the vidicon) the thermistor resistance changes, causing the collector current of the DC amplifier Q115 to change which in turn changes the collector voltage.

The target voltage applied to the vidicon is set by VR114 (TARGET).

If the temperature goes up, the resistance of the thermistor decreases so that the total resistance connected between the emitter of Q115 and ground decreases, and the current flowing through the collector and emitter increases.

Accordingly, the collector potential of Q115 falls, and the target voltage which is set by VR114 is reduced. Reduced target voltage causes less output from the tube. In this way, the video dark current which is raised by an increase in temperature is lowered.

When the temperature falls, the reverse operation takes place.

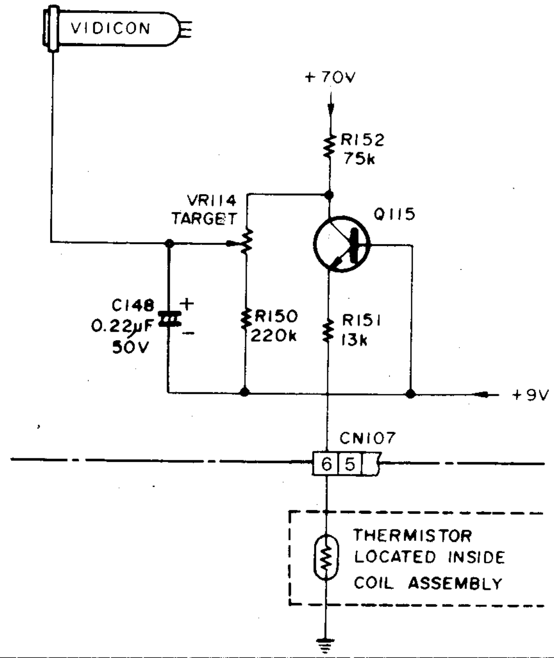

VIDICON
+70V
R152
75k
VR114
TARGET
Q115
C148
0.22μF
50V
R150
220k
R151
13k
+9V
CN107
6
5
THERMISTOR
LOCATED INSIDE
COIL ASSEMBLY

Fig. 3-13-2 Target Voltage Control Circuit

### 3-14. EVF Video Amplifier Circuit

Outline

This circuit amplifies the PAL signal supplied from the Process circuit board and fed it to the cathode ray tube(CRT) together with the blanking pulse which is used to block retrace line on the CRT screen.

Details

The PAL signal from the Process circuit board is applied to an amplifier in IC103 through terminal No. 1 of BI109, R117, CL101 and VR107 (CONTRAST).

CL101 is a trap for removing the chrominance component in the PAL signal.

The amplified signal obtained at pin 9 of IC103 is mixed with both the horizontal(H) and vertical(V) blanking pulses by resistance mix using R171, R170 and R161.

The mixed signal is then supplied to the grid-1 (G1) of the CRT through terminal No. 4 of BI105 and amplifier Q124 together with the DC voltage set by VR121 (BRIGHTNESS). When the white balance switch on the side of the camera is set to the CHECK position, the white balance indicator signal generated in the indicator circuit is also mixed with the video signal through R187.

### 3-15. EVF Sync Separation Circuit

Outline

This circuit generates the sync pulses from the composite PAL signal supplied from the Process circuit board and sends the horizontal (H) sync pulse to the H.deflection circuit and vertical(V) sync pulse to the V.deflection circuit.

Details

The PAL signal from the Process circuit board is supplied to a sync separator in IC103 through terminal No. 1 of BI109, R117 and CL101.

The sync separator in IC103 detects only sync pulse of video signal.

The separated sync pulse at pin 17 of IC103 is fed to phase comparator in IC108, where only the H.sync pulse passes. The H.sync pulse is then fed to the horizontal deflection circuit for the viewfinder.

The sync pulse at pin 17 of IC103 is applied to the integrator consisting of R120 and C121, where only the V.sync pulse is passed. The V.sync pulse is applied to the vertical deflection circuit for the viewfinder.

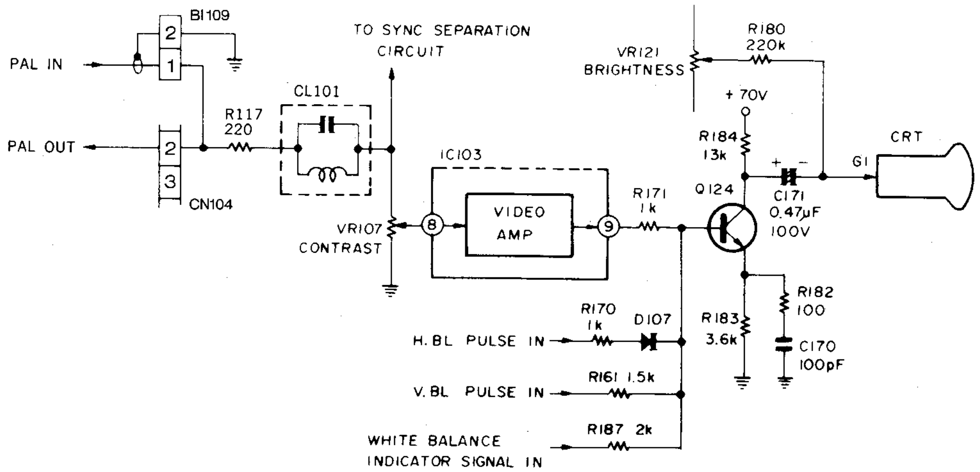

BI109
PAL IN
PAL OUT
CN104
TO SYNC SEPARATION CIRCUIT
CL101
R117 220
IC103
VIDEO AMP
VR107 CONTRAST
R171 1k
Q124
R184 13k
+70V
VR121 BRIGHTNESS
R180 220k
C171 0.47μF 100V
G1
CRT
R182 100
C170 100pF
R183 3.6k
R170 1k
D107
H. BL PULSE IN
V. BL PULSE IN
R161 1.5k
R187 2k
WHITE BALANCE INDICATOR SIGNAL IN

Fig. 3-14 EVF Video Amplifier Circuit

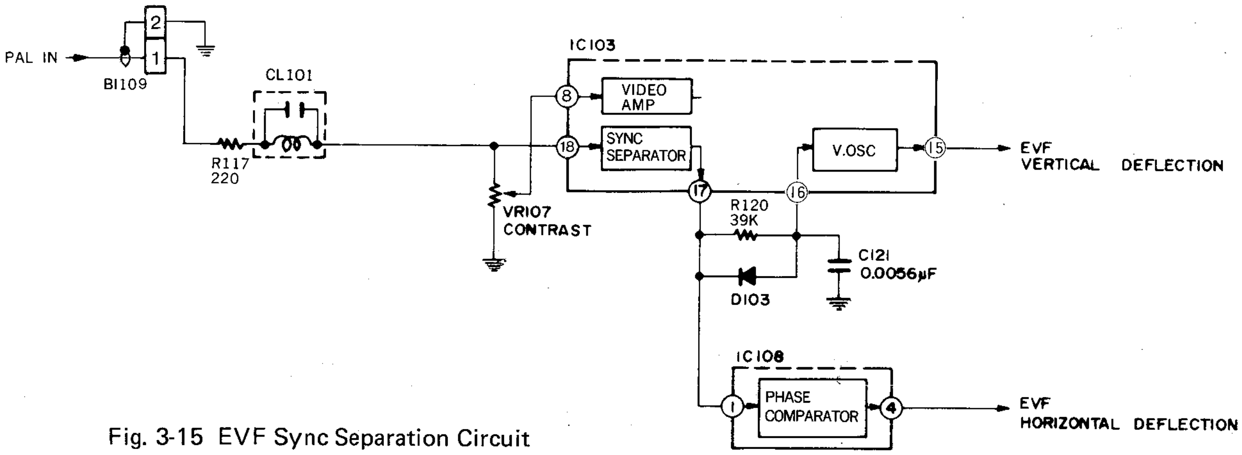

PAL IN
BI109
CL101
R117 220
IC103
VIDEO AMP
SYNC SEPARATOR
V.OSC
VR107 CONTRAST
R120 39K
C121 0.0056μF
D103
IC108
PHASE COMPARATOR
EVF VERTICAL DEFLECTION
EVF HORIZONTAL DEFLECTION

Fig. 3-15 EVF Sync Separation Circuit

## 3-16. EVF Vertical Deflection Circuit

### Outline

This circuit generates vertical deflection sawtooth current for vertical scanning of beam inside the cathode ray tube (CRT).

### Details

The vertical (V) sync pulse generated from the video composite signal in the sync separation circuit is fed to the V.oscillator (OSC) inside IC103 as a trigger pulse. The V.OSC is a free-running sawtooth generator whose frequency is approximately 45Hz When the trigger pulse is supplied to the V.OSC, it generates a 50Hz sawtooth signal.

The V.sawtooth signal obtained at pin 15 of IC103 is fed to pin 2 of amplifier IC107, where it is amplified.

The amplified V.sawtooth signal at pin 5 of IC107 is fed to the V.deflection coil through terminal No. 3 of CN106.

VR115(EVF V.SIZE) is a control for vertical scanning size.

The V.sawtooth signal at pin 5 of IC107 is also supplied to switching amplifier Q117 where a vertical blanking (V.BL) pulse is generated. The V. BL pulse is then mixed with the video signal through R161.

## 3-17. EVF Horizontal Deflection Circuit

### Outline

This circuit generates the horizontal deflection sawtooth current for horizontal scanning of the beam inside the cathode ray tube (CRT). This circuit controls the frequency (phase) of the horizontal sawtooth current to correspond to that of horizontal sync pulse separated from the video signal.

### Details

The horizontal (H) sync pulse from the sync separator inside IC103 is applied to the phase comparator inside IC108.

The flyback pulse obtained at the secondary winding of transformer T101 is fed to the integrator consisting of R163 and C156 and converted into a H.sawtooth signal. The H.sawtooth signal is supplied through C157 to the phase comparator and compared with the H.sync pulse in phase. The DC voltage corresponding to the phase difference is fed to the H.oscillator (H.OSC) inside IC108 through pin 4 and 9 to control the its oscillation frequency.

In this way, the H.OSC is automatically controlled to match its oscillation frequency with that of the sync pulse.

VR116(H.HOLD) is a control for setting the oscillation frequency in a steady state.

The frequency controlled H.pulse from the H.OSC is then fed to the H.deflection output Q119 through the H.driver inside IC108. The H.deflection sawtooth current is supplied to the H.deflection coil from Q119 through C163, L104/R168 and terminal No. 1 of CN106.

VR117(EVF H.SIZE) is a control for the horizontal scanning size.

The flyback pulse at the collector of Q119 is supplied to the high voltage circuit through buffer Q120/Q121. The H. pulse at the emitters of Q120/Q121 is mixed with the video signal through R170 and D107 as a H.blanking pulse.

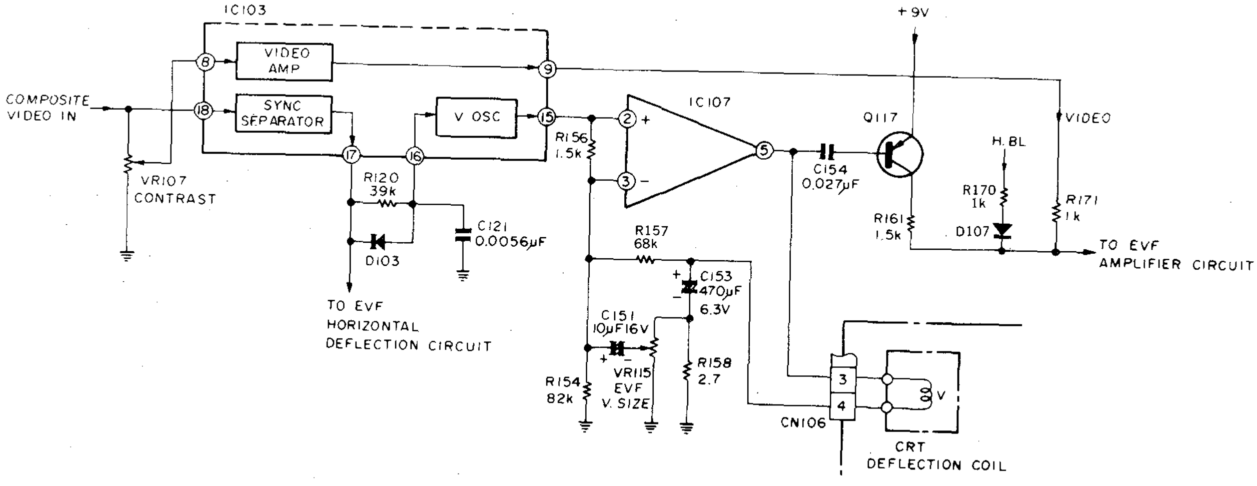

IC103
VIDEO AMP
SYNC SEPARATOR
V OSC
8
18
9
15
17
16
COMPOSITE VIDEO IN
VR107 CONTRAST
R120 39k
C121 0.0056μF
D103
TO EVF HORIZONTAL DEFLECTION CIRCUIT
R156 1.5k
IC107
2
3
5
R157 68k
C153 470μF 6.3V
C151 10μF16V
VR115 EVF V. SIZE
R154 82k
R158 2.7
C154 0.027μF
Q117
+9V
R161 1.5k
H. BL
R170 1k
D107
R171 1k
VIDEO
TO EVF AMPLIFIER CIRCUIT
3
4
CN106
V
CRT DEFLECTION COIL

Fig. 3-16 EVF Vertical Deflection Circuit

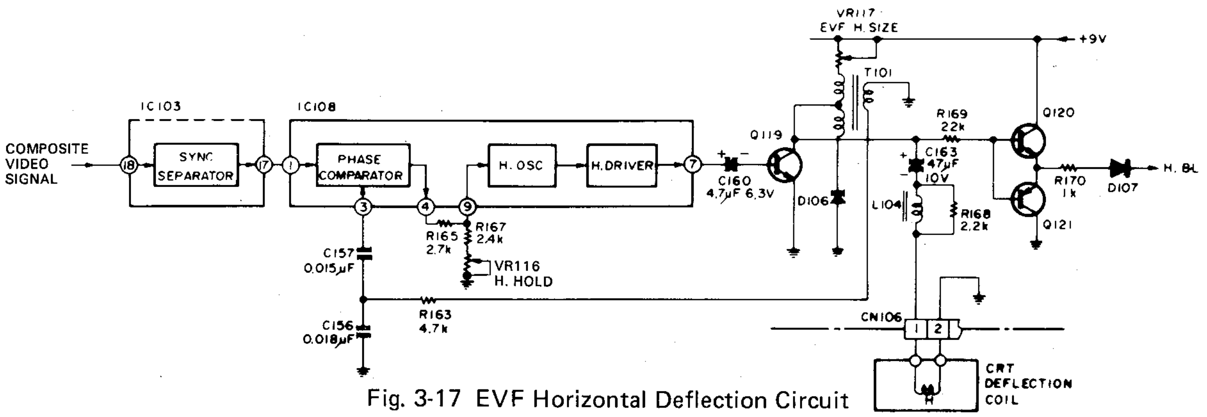

VR117
EVF H.SIZE
+9V
T101
IC103
IC108
COMPOSITE VIDEO SIGNAL
SYNC SEPARATOR
PHASE COMPARATOR
H. OSC
H.DRIVER
Q119
R169 22k
Q120
C163 47μF 10V
C160 4.7μF 6.3V
D106
L104
R168 2.2k
R170 1k
D107
H. BL
Q121
R167 2.4k
R165 2.7k
C157 0.015μF
VR116 H. HOLD
R163 4.7k
C156 0.018μF
CN106
CRT DEFLECTION COIL
H

Fig. 3-17 EVF Horizontal Deflection Circuit

### 3-18. High Voltage Circuit

Outline

This circuit generates high voltages needed for the vidicon and the cathode ray tube(CRT).

Details

The flyback pulse generated in the viewfinder horizontal deflection circuit is supplied to the primary winding of step-up transformer in T102 to step up the flyback pulse to necessary level. The boosted pulses obtained at the secondary winding of step-up transformer are rectified to generate high voltages.

The high voltages for the CRT are derived as follows.

+4.5KV obtained by rectifying the boosted pulse is supplied to the CRT anode.

The voltage for grid-1(G1) is derived by dividing −60V(obtained at pin 10 of T102) with VR121 (BRIGHTNESS). It is fed to G1 together with the video signal.

The voltage for grid-2(G2) is derived by dividing +340V(obtained at pin 8 of T102) with R176 and R179. +620V(obtained at pin 13 of T102) is fed to grid-3(G3) through VR119(EVF FOCUS). The heater voltage(3V) is obtained by supplying +9V and +6V to each end of heater respectively.

The high voltages for the vidicon are derived as follows. The −60V obtained at pin 10 of T102 is fed to grid-1(G1) through VR118(BEAM). The +340V at pin 8 of T102 is applied to grid-2 (G2) directly. +1.5KV obtained at pin 14 of T102 is supplied to grid-6(G6). The voltages for grid-4(G4) and grid-5(G5) are obtained by dividing +1.5KV by block resistor BR107 and VR120 (CAMERA FOCUS). +6V is fed to the heater.

Q122 prevents a beam spot appearing on the CRT screen for a while after the Power switch is turned OFF.

In the operating condition, Q122 is energized and the proper voltage for grid-1(G1) of CRT is set between +9V and −60V by VR121(BRIGHTNESS). When the power switch is turned OFF, Q122 becomes OFF and VR121 is disconnected from the +9V line. Therefore, −60V charged into the capacitor inside T102 is not discharged and −60V is fed to G1 of CRT. In this way, the electron beam is blocked preventing beam spot on the CRT screen.

The +70V obtained at pin 9 of T102 is fed to the cathode blanking circuit, dynamic focus correction circuit, target voltage control circuit and viewfinder video output circuit.

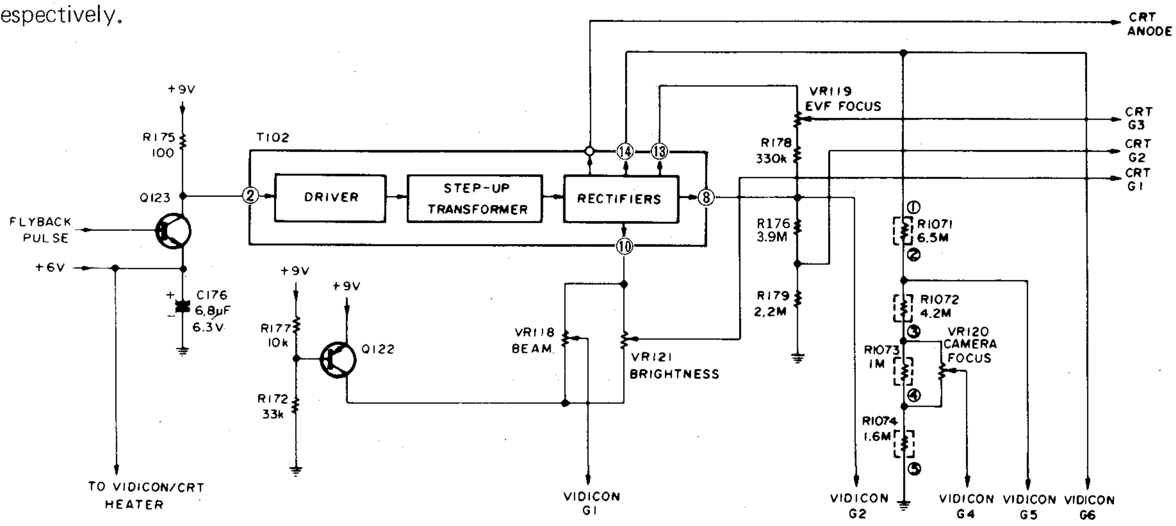

CRT ANODE
VR119 EVF FOCUS
CRT G3
CRT G2
CRT G1
+9V
R175 100
T102
R178 330k
Q123
DRIVER
STEP-UP TRANSFORMER
RECTIFIERS
FLYBACK PULSE
+6V
R176 3.9M
R1071 6.5M
C176 6.8μF 6.3V
+9V
+9V
R179 2.2M
R1072 4.2M
R177 10k
Q122
VR118 BEAM
VR121 BRIGHTNESS
VR120 CAMERA FOCUS
R1073 1M
R172 33k
R1074 1.6M
TO VIDICON/CRT HEATER
VIDICON G1
VIDICON G2
VIDICON G4
VIDICON G5
VIDICON G6

Fig. 3-18 High Voltage Circuit

## 3-19. Target Protection/Playback Detect Circuit

### • Target Protection Circuit

Outline

If no deflection current flows to the vidicon deflection coil because of a horizontal(H) or vertical(V) deflection circuit failure, the scanning process would stop, and the vidicon electron beam would remain stationary.

Should this happen, the photoconductive layer of the vidicon would be burned in one spot, making the vidicon unusable.

The vidicon target protection circuit protects the photoconductive layer from burn-out in the event of a deflection circuit failure by stopping the generation of high voltages supplied to the vidicon grids and thus cutting off the electron beam.

Details

The V. sawtooth signal which is made from the V.deflection sawtooth signal in the V.sawtooth/parabola generator circuit is fed to switcher Q114. The DC voltage at the junction point of R1081 and R1082 is applied to the base of another switcher Q118. The DC voltage at the junction point of VR109 (H.SIZE) and R128 in the camera horizontal deflection circuit is supplied to the emitter of Q118.

Under normal conditions, the emitter of Q118 is biased approximately 1.6V, and the base of Q118 approximately 1.5V since playback detector Q113 and Q114 are turned ON. In this case, Q118 is turned OFF and the H.oscillator inside IC108 operates normally. Thus the H.flyback pulse is sent to the high voltage circuit generating the high voltages.

If the V.deflection circuit fails, the V.sawtooth signal is not applied to the base of Q114, turning OFF Q114, biasing the base of Q118 approximately 3.3V and switching ON Q118. As a result, the H.oscillator stops its oscillation.

If the Hs pulse is not supplied to the H.deflection circuit, the H.deflection circuit fails or the coil assembly is disconnected, the emitter potential of Q118 is lowered turning it ON. The H.oscillator thus stops its oscillation.

### • Playback Detect Circuit

Outline

When the portable VTR is set to the playback mode, most of circuits in the Process circuit board are shut off by the playback sense circuit in the Process circuit board. As a result, no Hs and Vs pulses are supplied to the deflection circuit.

This circuit makes the high voltage circuit into operating condition for observing the playback picture on the viewfinder screen when the portable VTR is set to the playback mode.

Details

In the playback mode of portable VTR, +3.3V is not generated in the Process circuit board as well as +9V, the Hs pulse and the Vs pulse. Therefore, playback detector Q113 is turned OFF and the potential of Q118 base is lowered to turn it OFF. As a result, the high voltages for the cathode ray tube(CRT) are generated.

Though the high voltages for the vidicon are also generated at the same time while no deflection signals are generated.

The vidicon is protected from burn-out by following operation.

When the Vs pulse is not applied to the V.deflection circuit, the potential at pin 1 of IC105 in the V.deflection circuit becomes extremely high or low, even though the V.sawtooth signal is not produced. Therefore, the electron beam is aimed outside of the photoconductive layer in the vidicon. In this way, vidicon is protected.

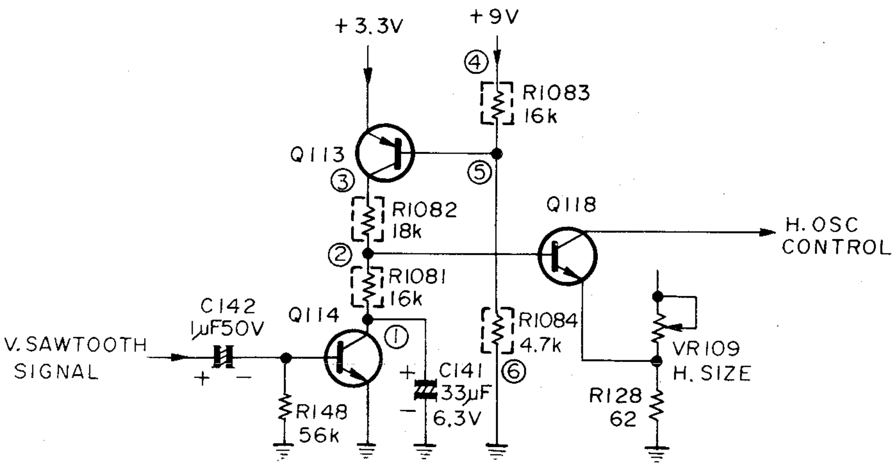


Fig. 3-19 Target Protection/Playback Detect Circuit

## 3-20. White Balance Indicator Circuit

### Outline

When the camera is pointed at a white object and the white balance switch on the side of the camera is set to the CHECK position, the horizontal white balance indicator bar appears on the cathode ray tube (CRT).

The vertical position of horizontal white bar on the CRT indicates the condition of white balance. When white balance is set properly, the horizontal white bar falls to the lowest point on the CRT.

### Details

In the Process circuit board, the chrominance signal is rectified and converted into a DC voltage which indicates the amount of unbalance.

When the white balance switch on the side of the camera is set to the CHECK position, this DC voltage is fed to pin 3 of comparator IC109(1/2) through terminal No. 12 of BI102. The vertical(V) sawtooth signal Ⓐ is supplied to pin 2 of IC109 from the V.sawtooth / parabola generator circuit.

The DC voltage and the V.sawtooth signal are compared in IC109, and V.pulse Ⓑ whose width is controlled by the DC voltage is generated at pin 1 of IC109.

The V.pulse Ⓑ is then applied to pin 6 of switching amplifier IC109(1/2) through the differentiator consisting of C172 and R1063 in block resistor BR106( Ⓒ ). The V.pulse Ⓓ whose phase is controlled by the DC voltage is obtained at pin 7 of IC109 as a white balance indicator signal.

This signal is mixed with the video signal through R187 and supplied to the cathode ray tube (CRT).

When the white balance switch is set to the upper (normal) position, the low potential is supplied to pin 3 of IC109, and no V.pulse is generated. Therefore, the white bar disappears from the CRT screen.

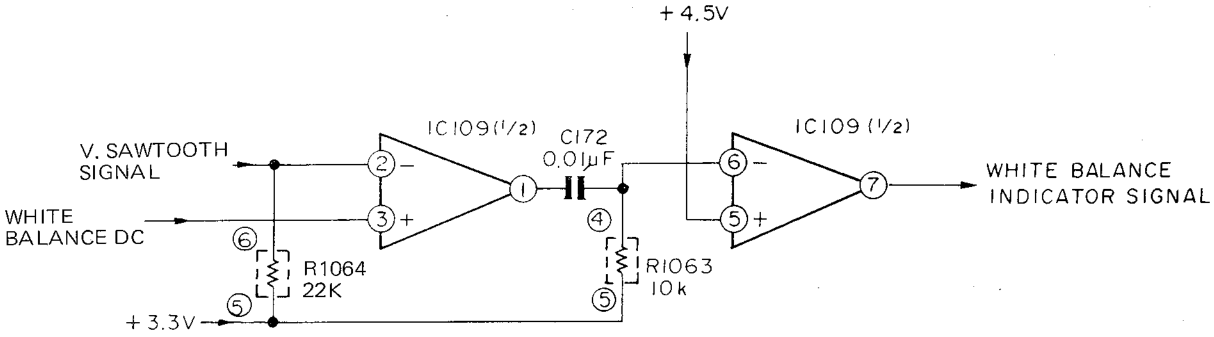

+4.5V
IC109(1/2)
C172
0.01μF
V. SAWTOOTH SIGNAL
WHITE BALANCE DC
②
③
①
④
⑥
R1064
22K
⑤
+3.3V
R1063
10k
⑤
IC109 (1/2)
⑥
⑤
⑦
WHITE BALANCE INDICATOR SIGNAL

Fig. 3-20-1 White Balance Indicator Circuit

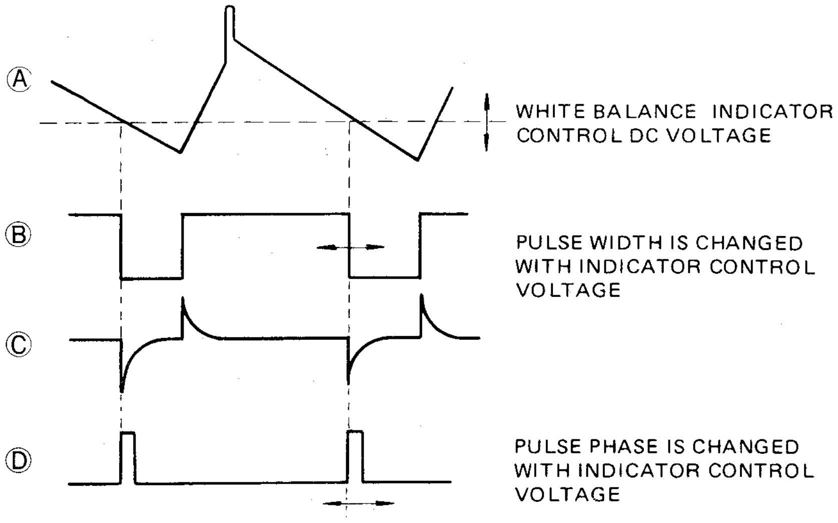

Ⓐ
WHITE BALANCE INDICATOR CONTROL DC VOLTAGE
Ⓑ
PULSE WIDTH IS CHANGED WITH INDICATOR CONTROL VOLTAGE
Ⓒ
Ⓓ
PULSE PHASE IS CHANGED WITH INDICATOR CONTROL VOLTAGE

Fig. 3-20-2 White Balance Indicator Signal

## 4. Sync Circuit board (YWV3030ZK06)

### Outline

This circuit board generates PAL sync pulses and sends them to the Process circuit board.

### Details

A 17.7MHz frequency oscillated by the crystal oscillator consisting of X601, VC601 (4.43 MHz ADJ), C608, C609 and R601 is phase-compared in IC301 with the frequency fx generated by the voltage controlled oscillator (VCO), which is composed of R6021, T601 (VCO VOLTAGE ADJ), C601, C602, D601 and D602 and connected to pins 3 and 4 of IC601. The phase detected output is sent from pin 5 of IC601 to variable capacitance diodes D601 and D602 in VCO to drive them and control the VCO frequency.

This phase lock loop circuit always keeps interleaving relationship among subcarrier, horizontal and vertical frequency generated by IC601.

The following signals/pulses are generated from IC601 and sent to the Process circuit board through CN601.

| | |
|---|---|
| Pin 8 : PRE BL | (Preblanking pulse) |
| Pin 9 : Hs | (Horizontal scanning start pulse) |
| Pin 10 : BL | (Composite blanking pulse) |
| Pin 11 : BFP | (Burst flag pulse) |
| Pin 18 : D. HD | (Delayed horizontal drive pulse) |
| Pin 19 : Vs | (Vertical scanning start pulse) |
| Pin 21 : SYNC | (Composite sync pulse) |
| Pin 26 : (R-Y)SC | (Subcarrier for R-Y modulation) |
| Pin 27 : (B-Y)SC | (Subcarrier for B-Y modulation) |

The relative timing information for each pulse is shown in Fig. 4-1.

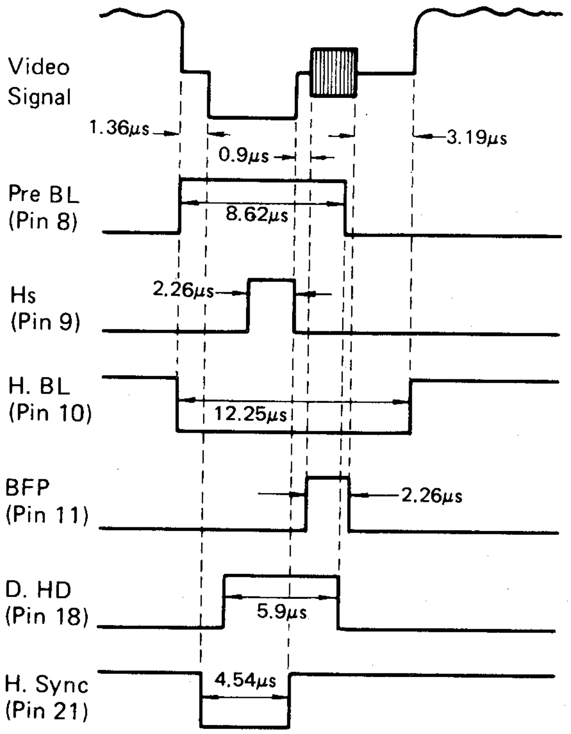


Fig. 4-1 Pulses

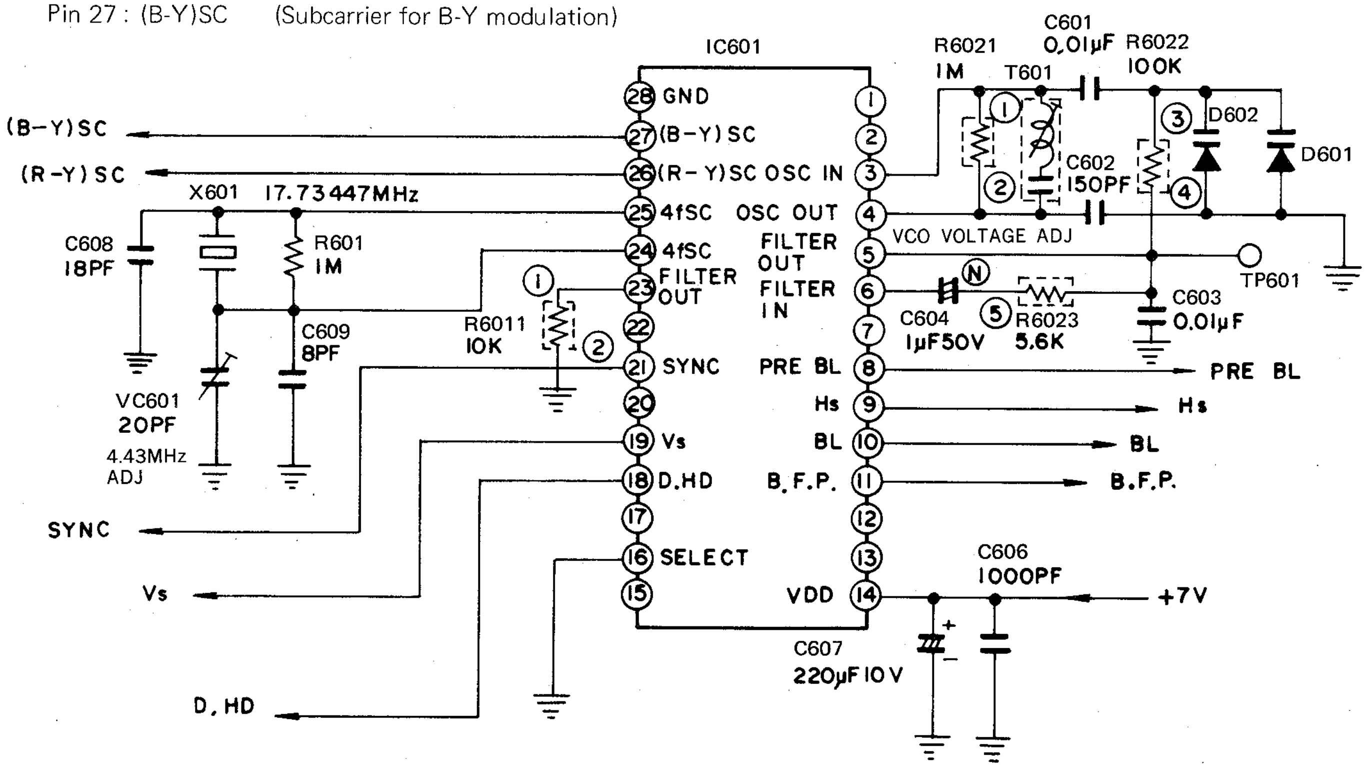

IC601
28 GND
27 (B-Y) SC
26 (R-Y) SC
25 4fSC
24 4fSC
23 FILTER OUT
22
21 SYNC
20
19 Vs
18 D.HD
17
16 SELECT
15
1
2
3 OSC IN
4 OSC OUT
5 FILTER OUT
6 FILTER IN
7
8 PRE BL
9 Hs
10 BL
11 B.F.P.
12
13
14 VDD
(B-Y) SC
(R-Y) SC
X601 17.73447MHz
C608 18PF
R601 1M
C609 8PF
VC601 20PF
4.43MHz ADJ
R6011 10K
SYNC
Vs
D. HD
R6021 1M
T601
C601 0.01μF
R6022 100K
D602
D601
C602 150PF
VCO VOLTAGE ADJ
TP601
C604 1μF50V
R6023 5.6K
C603 0.01μF
PRE BL
Hs
BL
B.F.P.
C606 1000PF
+7V
C607 220μF 10V

Fig. 4-2 Sync Generator

# 5. Process Circuit Board (YWV3030ZK02)

The Process Circuit Board (YWV3030ZK02) contains following circuits.

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  5-2-1 Automatic Gain Control (AGC) Circuit ........ 25
  5-2-2 Tracking Signal Generator Circuit ........ 27
5-3 Luminance Signal Processing Circuit ........ 28
  5-3-1 Optical Black Clamp Circuit ........ 28
  5-3-2 $Y_H$ Signal Circuit ........ 29
  5-3-3 $Y_L$ Signal Circuit ........ 31
  5-3-4 Y (edge) Signal Circuit ........ 31
5-4 Automatic Iris Control (AIC) Circuit ........ 31
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5-7 Vertical Edge Signal Generator Circuit ........ 34
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  5-8-4 Tracking Correction Circuit ........ 39
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  5-8-6 Blue Signal Detection Circuit ........ 41
5-9 Chrominance Encoding Circuit ........ 41
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  5-9-4 Chroma Clip/Suppression Circuit ........ 42
5-10 White Balance Detection Circuit ........ 43
5-11 PAL Signal Processing Circuit ........ 44
5-12 Playback Sense Circuit ........ 45

## 5-1. Pulse Distribution Circuit

### Outline

This circuit receives the signals/pulses from the Sync circuit board and sends to other circuits after processing them.

### Details

Approx. +7V is generated by regulating the +8.8V using zener diode D12 and diodes D13 and D14 in IC211. The +7V is used in IC211 and fed to the Sync circuit board through CN203 as a power source. Approx. +5V is obtained by regulating the +7V by Q19 in IC211 and D202 and supplied to IC207 and IC212 as a power source.

The delayed horizontal drive (D.HD) pulse Ⓐ and the sync pulse Ⓑ supplied through terminals No. 7 and No. 5 of CN203 are fed to pins 11 and 12 of NOR gates IC207 respectively. The clamp pulse (CP) Ⓒ obtained at pin 13 of IC207 is then mixed with the preblanking (pre BL) pulse Ⓓ (supplied through terminal No. 3 of CN203) through R2205/R2204 and R2206/R2207. The multiplexed signals Ⓔ are then fed to other circuits. The pre BL pulse Ⓓ is also supplied to other circuits through R2208.

The horizontal scanning start (Hs) pulse Ⓕ supplied through terminal No. 2 of CN203 is fed to other circuit through buffer Q15/Q16 in IC211. The multiplexed signal Ⓗ which is made by mixing the Hs pulse Ⓕ and the blanking (BL) pulse Ⓖ (supplied through terminal No. 4 of CN203 and inverter Q17 in IC211) through R2215 and R2214 is fed to other circuits.

The vertical scanning start (Vs) pulse supplied through terminal No. 1 of CN203 is sent to other circuit through inverter Q14 in IC210.

The subcarrier (R-Y)SC is fed through terminal No. 9 of CN203 and pin 14 of IC205 to R-$Y_L$ balance modulator. The subcarrier (B-Y)SC is supplied to B-$Y_L$ balance modulator in IC205 through terminal No. 10 of CN203, IC211, IC207 and pin 16 of IC205. The (B-Y)SC is also fed to vertical edge signal generator circuit through R2201.

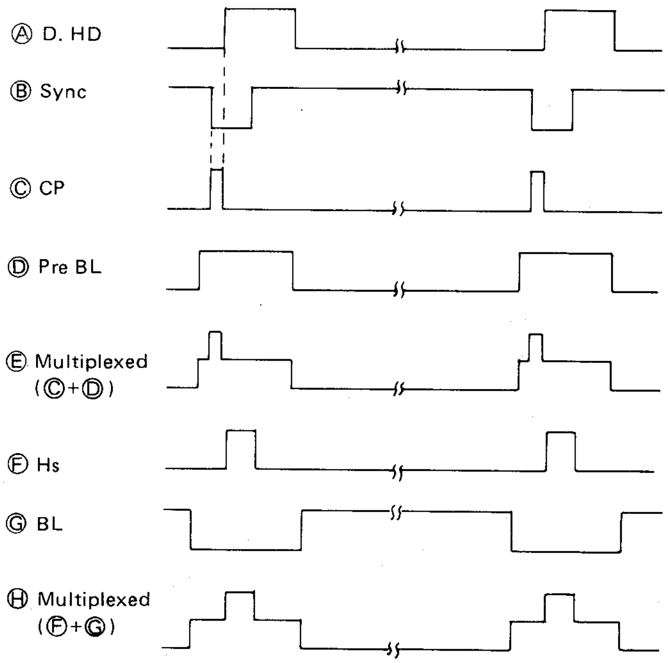


Fig. 5-1-1 Multiplexed Pulse

The (R-Y)SC and (B-Y)SC signals Ⓘ supplied to pins 2 and 6 of IC207 are gated by the burst flag pulse (BFP) Ⓙ fed to pins 3 and 5 of IC207 through inverter Q18 in IC211. The gated SC signals Ⓚ are then mixed through R2223 and R2224, and supplied via buffer Q21 in IC212 to band pass filter consisting of L212, L213, C257 and C16 in IC212. The burst signal Ⓛ obtained by removing the low frequency components from the gated SC signals Ⓚ with the band pass filter is then sent to phase shifter Q20 in IC212. The phase-shifted burst signal at the junction point of VC202 (BURST PHASE) and R243 is then mixed with the sync pulse Ⓜ through R2212 and R2213. The mixed signal Ⓝ is supplied to the burst/sync mix inside IC203 through pin 7.

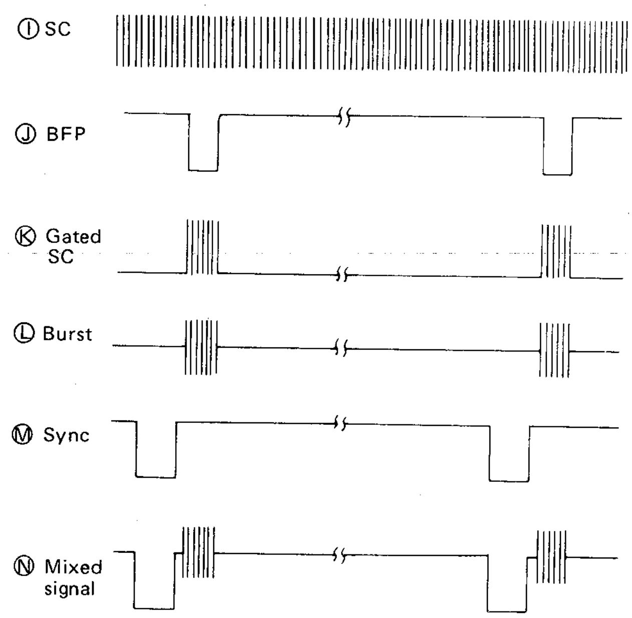


Fig. 5-1-2 Burst/Sync Signal

## 5-2. AGC/Tracking Signal Generator Circuit

### 5-2-1. Automatic Gain Control (AGC) Circuit

**Outline**

This circuit amplifies the preamplifier output signal. The amplified signal level is maintained constant by automatically controlling the gain of the amplifier. The automatic gain control (AGC) circuit starts to operate only when the lens iris is fully opened.

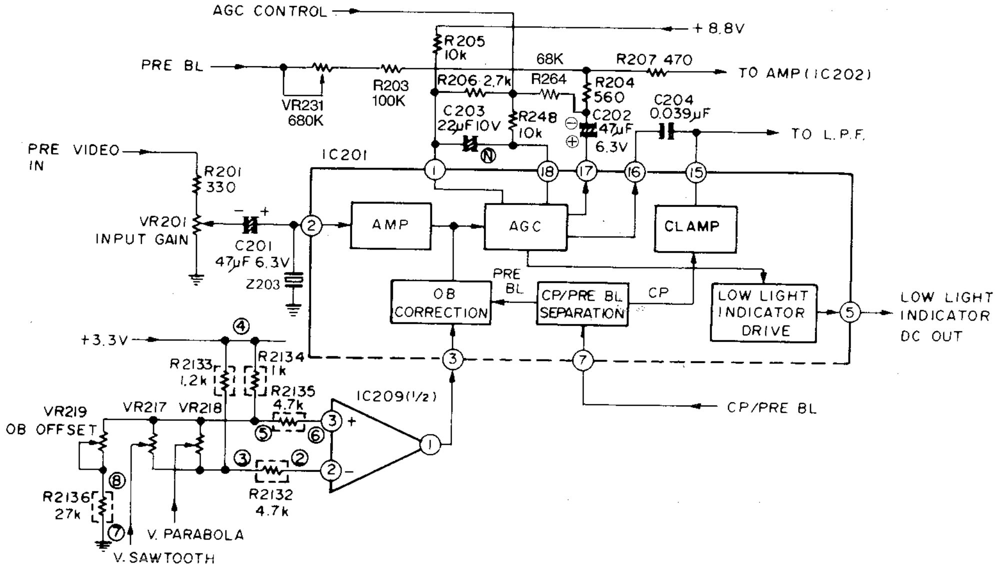
**Details**

The output signal of the Preamplifier circuit board (YWV3030ZK05) goes to terminal No. 1 of CN206. After its level is set by VR201 (INPUT GAIN), it goes to the amplifier inside IC201 through pin 2. The amplified pre-video signal from the amplifier is mixed with the modulated preblanking (Pre BL) pulse for the optical black (OB) correction. Z203 is a 4.43MHz trap which removes the subcarrier component.

- **Optical black (OB) correction**

The pick-up tube sends out current corresponding to the incoming light intensity, but even when no light whatsoever reaches the target, an output current called dark current exists. The dark current of the vidicon is relatively large and varies depending upon the temperature of the vidicon. In a TV camera using a vidicon, the black level of the output signal is generally unstable due to temperature variations.

Accordingly, this color camera uses a metallic strip (optical black) in front of the vidicon photoconductive layer to cut off the incoming light at the end of the horizontal scanning period. The optical black causes only the dark current to be detected which is clamped at a specific potential to suppress black level variations. (Refer to Optical black clamp circuit on page 28.)



AGC CONTROL
+8.8V
R205 10k
PRE BL
68K
R207 470
TO AMP (IC202)
R203 100K
R206 2.7k
R264
R204 560
VR231 680K
C203 22μF 10V
R248 10k
C202 47μF 6.3V
C204 0.039μF
TO L.P.F.
Ⓝ
PRE VIDEO IN
R201 330
IC201
1
18
17
16
15
VR201 INPUT GAIN
C201 47μF 6.3V
2
AMP
AGC
CLAMP
Z203
PRE BL
OB CORRECTION
CP/PRE BL SEPARATION
CP
LOW LIGHT INDICATOR DRIVE
5
LOW LIGHT INDICATOR DC OUT
+3.3V
④
R2133 1.2k
R2134 1k
R2135 4.7k
3
7
CP/PRE BL
IC209(1/2)
VR219 OB OFFSET
VR217
VR218
⑤
⑥
③
②
R2132 4.7k
⑧
R2136 27k
⑦
V. PARABOLA
V. SAWTOOTH

Fig. 5-2-1 OB Correction/AGC Circuit

There is a level difference between the dark current detected from the optical black region and the actual dark current from active area of the tube. The pre BL pulse is mixed to correct the difference. In the pre-video signal, there is a dark shading difference between the dark current from the OB region and from active area of tube in vertical (V) rate. The modulated pre BL pulse is mixed with the pre-video signal to match the V.dark shading corresponding to the OB region to that corresponding to the active area of tube.

The vertical (V) sawtooth Ⓐ and parabola Ⓑ signals from the Deflection circuit board are fed to the wiper arm of VR217 (OB CORRECTION-SAW.) and VR218 (OB CORRECTION-PARA.) respectively. These waveforms are applied to both the non-inverted (pin 3) and inverted (pin 2) inputs of IC209 (1/2), where they are amplified. The output of IC209 (1/2) at pin 1 produces a positive or negative mixed signal Ⓒ of V.sawtooth and parabola signals depending on the position of these controls. The signal Ⓒ is then fed to the OB correction circuit inside IC201 through pin 3.

VR219 (OB OFFSET) controls the positive input potential of IC209 to change the output DC level.

The multiplexed signal of the clamp pulse (CP) and pre BL pulse is fed from the pulse distribution circuit to the CP/Pre BL separator inside IC201 through pin 7, where the CP and Pre BL pulse are separated. The separated pre BL pulse is fed to the OB correction circuit inside IC201. The amplified pre-video signal Ⓓ is then modulated by the mixed signal Ⓒ and pre BL signal for correcting the difference of dark current level and matching the dark current shading Ⓔ & Ⓕ.

VR217 and VR218 are controls for matching the dark current shading and VR219 is for correcting the difference of dark current level.

The corrected pre-video signal is then fed to the automatic gain control (AGC) circuit inside IC201.

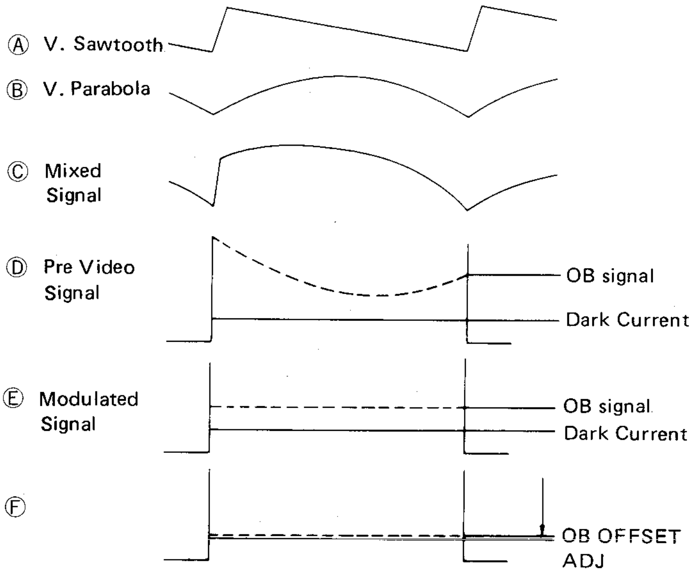


Fig. 5-2-2 OB Correction

- **Automatic gain control (AGC) circuit**

The DC voltage which supplied from the AIC driver inside IC202 to automatic iris control (AIC) lens to control its iris opening is also supplied to the AGC amplifier inside IC201 through pin 18 of IC201.

In order to open the iris, the iris control voltage must be increased.

When the AIC lens works properly, the relatively low DC voltage is supplied to the AGC amplifier from the AIC driver and AGC amplifier becomes fixed gain amplifier. The amplified signal is fed through pin 17 of IC201 and pin 18 of IC202 to the 14dB amplifier inside IC202.

When the camera is pointed at a weakly illuminated scene, the iris control voltage is increased to open the lens iris. However, the lens iris becomes fully open at a certain iris control voltage and cannot be opened any more even when the DC voltage is increased. When the lens iris is wide open by the increased DC voltage, the AGC amplifier assumes a differential amplifier configuration whose gain is automatically controlled by the DC voltage supplied through pin 18 to keep the signal level constant.

In this way, the signal level corresponding to normal and relatively high illumination is kept constant by the lens iris opening while the signal level corresponding to relatively low illumination is controlled by the AGC circuit.

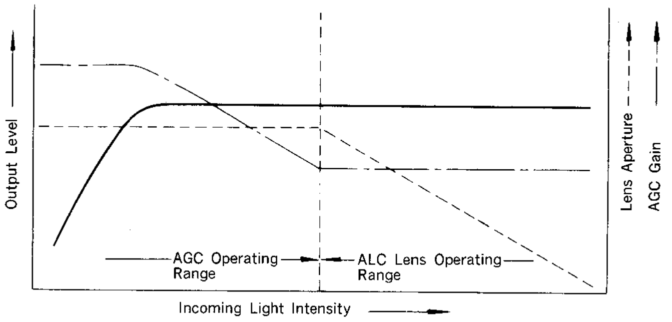


Fig. 5-2-3 AGC Operation

The preblanking pulse mixed with the amplified pre-video signal through VR231 (Y PEDESTAL) and R203 sets the pedestal level of luminance signal.

The amplified pre-video signal from the AGC amplifier is also fed to the tracking signal generator circuit through pin 16 of IC201.

The DC voltage is fed from the AGC amplifier to the Deflection circuit board through the low light indicator driver and pin 5 of IC201 to drive the low light indicator in the viewfinder. When the camera is aimed at the weakly illuminated scene, the DC voltage from the low light indicator driver is decreased.

## 5-2-2. Tracking Signal Generator Circuit

### Outline

The photoelectric conversion characteristic of the vidicon is not linear. The relatively high level of video signal from the vidicon undergoes greater suppression than that corresponding to dark picture part. (Fig. 5-2-4).

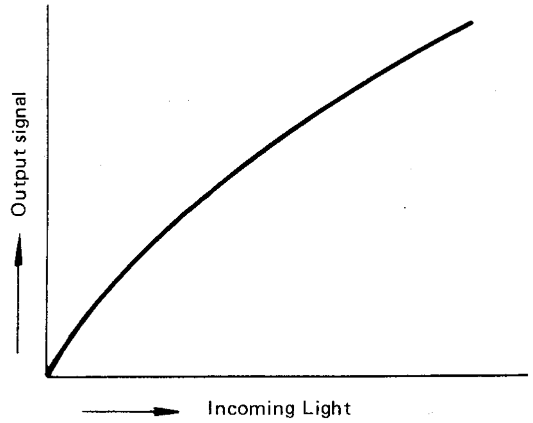


Fig. 5-2-4 Vidicon's Gamma Characteristic-1

In this color camera, the red(R) and blue(B) signals modulated at 3.58MHz are riding on top of the green(G) signal when they are extracted from the vidicon. So, signal's high level Ⓐ i.e., the modulated R and B component, is suppressed.

Therefore, the relatively high level of the modulated R(Rc) and modulated B(Bc) signals Ⓑ are also suppressed. (Fig. 5-2-5).

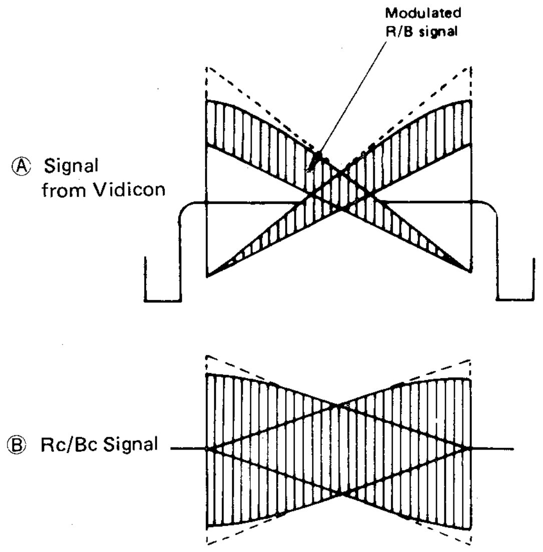


Fig. 5-2-5 Vidicon's Gamma Characteristic-2

As a result, the R and B signals obtained by detecting the Rc and Bc signals are suppressed more than $Y_L$ signal obtained by removing the 3.58MHz modulated component. (The gamma characteristic of the R and B signals differ from that of $Y_L$ signal).

The modulation depth of Rc and Bc signals corresponding to the weakly illuminated scene is reduced due to the over-beam in the pick-up tube. As a result, the low level portion of R and B signals may not match that of $Y_L$ signal.

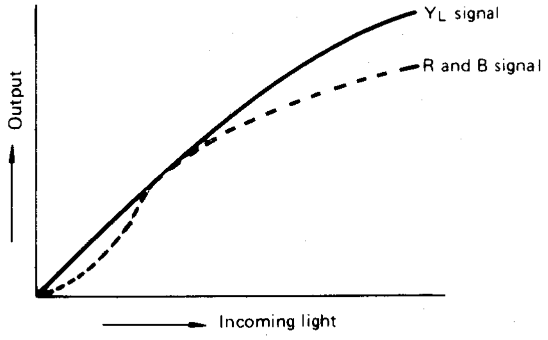


Fig. 5-2-6 Vidicon's Gamma Characteristic-3

The circuit generates the tracking signals for correcting the gamma characteristic of the R and B signals, and matching them with the $Y_L$ signal.

### Details

The amplified pre-video signal Ⓒ (which contains the modulated red and blue signals as well as the green signal) obtained at pin 16 of IC201 is fed to the clamp circuit inside IC201. The blanking period of signal Ⓒ is clamped by the clamp pulse (CP) supplied from the CP/Pre BL separator inside IC201.

The clamped signal is then supplied to the low pass filter LC201 where the 3.58MHz modulated component is removed and a luminance (Y) signal Ⓓ is made.

The Y signal Ⓓ is fed through pin 14 to the tracking-1 and 2 signal generator inside IC201 where a tracking-1 signal Ⓔ and a tracking-2 signal Ⓕ are generated respectively.

The tracking-1 signal Ⓔ at pin 9 of IC201 is supplied to VR213 (R. TRACKING-1) and VR228 (B. TRACKING-1) for correcting the relatively low level of R and B signals.

The tracking-2 signal Ⓕ at pin 8 of IC201 is fed to VR212 (R. TRACKING-2) and VR227 (B. TRACKING-2) for correcting the relatively higher portion of R and B signals.

The Y signal Ⓓ is also applied to the tracking-3 signal generator inside IC201 through pin 13. The tracking-3 signal Ⓖ at pin 11 of IC201 is fed to VR214 (R. TRACKING-3) and VR229 (B. TRACKING-3) for the high level of R and B signals.

The tracking-3 signal is also fed to the high Y level chroma clip circuit through LC206 which delays the tracking-3 signal to match the chrominance signal in phase.

The DC voltage which is set by VR202 (TRACKING-3 SET) and supplied to the tracking-3 signal generator through pin 12 determines the clip level for the tracking-3 signal.

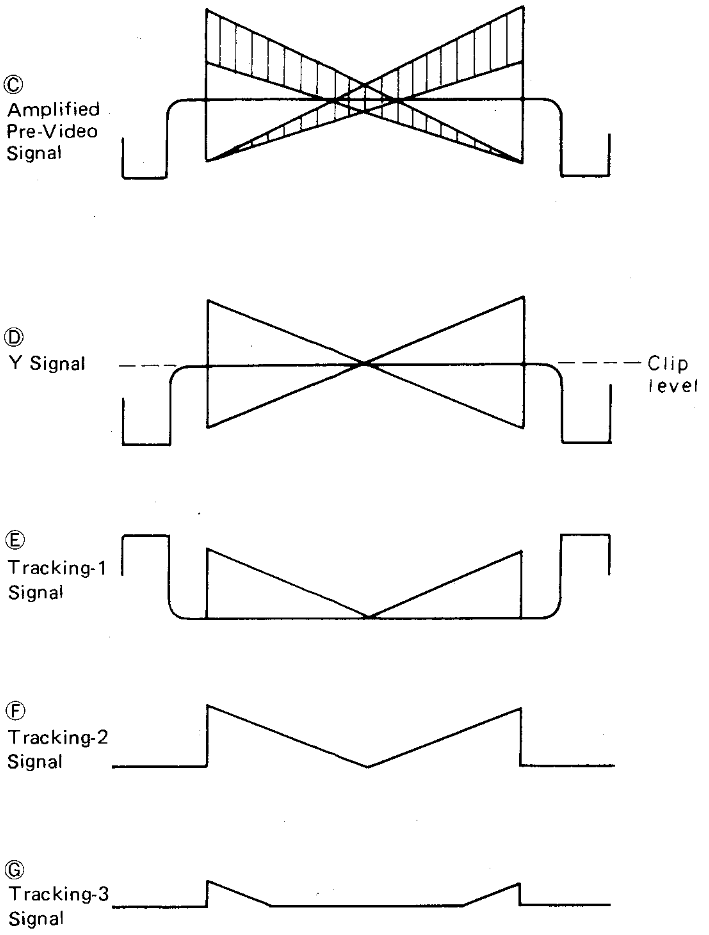

©
Amplified Pre-Video Signal
Ⓓ
Y Signal
Clip level
Ⓔ
Tracking-1 Signal
Ⓕ
Tracking-2 Signal
Ⓖ
Tracking-3 Signal

Fig. 5-2-7 Tracking Signals

## 5-3. Luminance Signal Processing Circuit

This circuit contains the optical black clamp circuit, $Y_H$ signal circuit, $Y_L$ signal circuit and Y (edge) signal circuit.

### 5-3-1. Optical Black Clamp Circuit

Outline

The pick-up tube sends an output current corresponding to the incoming light intensity, but even when no light reaches the target, an output current called dark current is obtained. The dark current of the vidicon is relatively large and varies with the temperature of the vidicon. In a TV camera using a vidicon, the dark level of the output signal is extremely unstable with respect to changing temperature.

In a color camera using the single carrier frequency multiplexing system, the red(R) and blue(B) signals modulated at 3.58MHz are riding on top of the green(G) signal. Thus the black level of the R and B signals are free from temperature variations because they are independent of vidicon dark current.

However, the black level of the Y signal which is obtained by removing the modulated R and B components from the vidicon output increases or decreases according to temperature variations. Therefore, the black level balance between the $Y_L$ and R signals, and between $Y_L$ and B signals are lost due to a temperature variations and this causes a change in color reproduction.

This circuit receives the amplified pre-video signal from the AGC circuit and clamps its dark current level for correcting the black level variation.

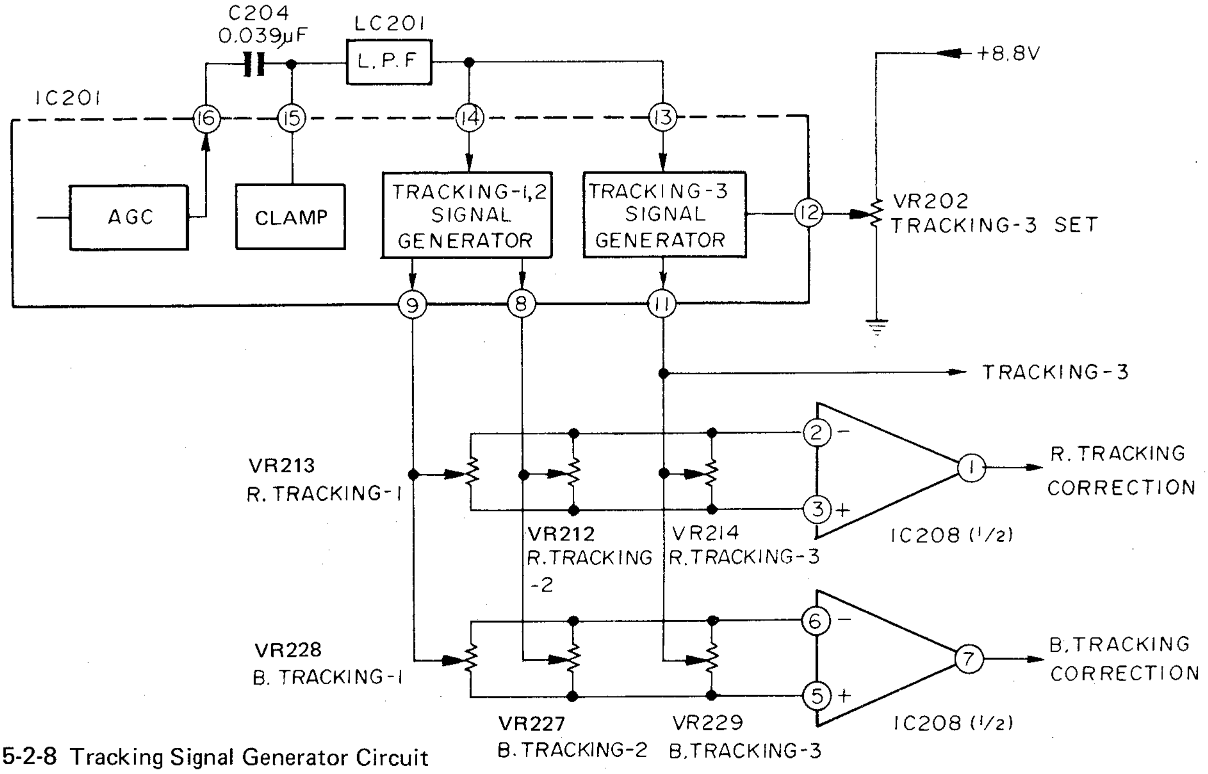

C204
0.039μF
LC201
L.P.F
IC201
16
15
14
13
12
9
8
11
AGC
CLAMP
TRACKING-1,2 SIGNAL GENERATOR
TRACKING-3 SIGNAL GENERATOR
+8.8V
VR202
TRACKING-3 SET
TRACKING-3
VR213
R. TRACKING-1
VR212
R.TRACKING -2
VR214
R.TRACKING-3
2
3
1
R. TRACKING CORRECTION
IC208 (1/2)
VR228
B. TRACKING-1
VR227
B.TRACKING-2
VR229
B.TRACKING-3
6
5
7
B.TRACKING CORRECTION
IC208 (1/2)

Fig. 5-2-8 Tracking Signal Generator Circuit

### Details

The amplified pre-video signal which contains the modulated red/blue signals and green signal is fed from the AGC amplifier inside IC201 to the 14dB amplifier through pin 17 of IC201 and pin 18 of IC202. The amplified signal is fed through pin 17 of IC202 and C207 to optical black (OB) clamp circuit inside IC202. A metallic strip (optical black) for cutting the incoming light at the end of the horizontal scanning period is built into the vidicon faceplate.

When the beam scans the optical black portion Ⓐ, the dark current of the vidicon is produced and this signal portion Ⓑ is clamped to a fixed DC potential, so that the black level variation due to a change of dark current is sensed.

In other words, the dark current level Ⓑ' of the amplified pre-video signal Ⓑ supplied to the clamp circuit inside IC202 is clamped by the clamp pulse (CP) Ⓒ' separated from the multiplexed signal of CP, pre BL and parabola signal, inside IC202. (The multiplexed signal of CP and pre BL pulses is generated in the pulse distribution circuit and mixed with the horizontal and vertical parabola signals supplied through D201.)

Therefore, even if the dark current level drift due to the temperature variations, the DC potential of the optical black (OB) level is held constant.

In this way, the black level variation is corrected.

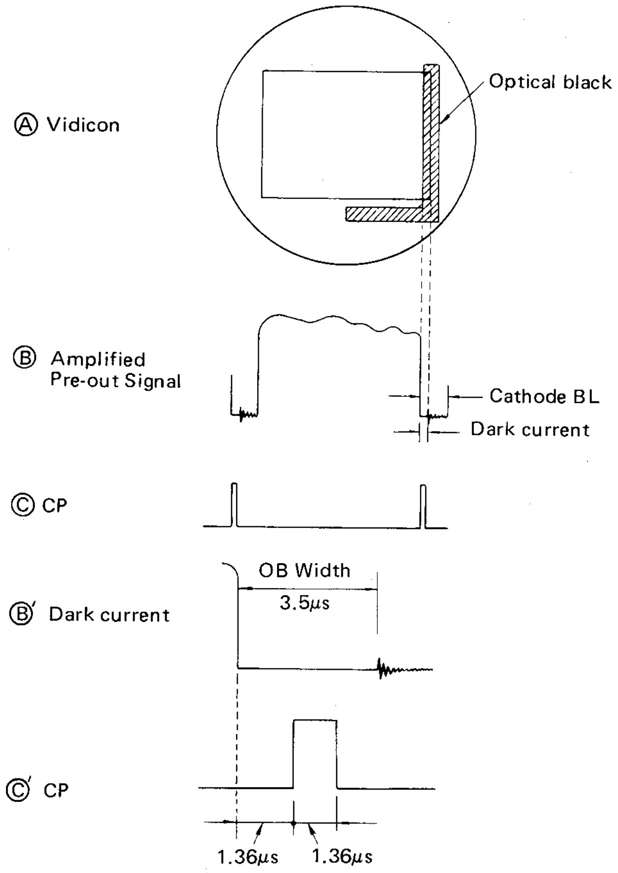

Ⓐ Vidicon
Optical black
Ⓑ Amplified Pre-out Signal
Cathode BL
Dark current
Ⓒ CP
OB Width
3.5μs
Ⓑ' Dark current
Ⓒ' CP
1.36μs
1.36μs

Fig. 5-3-2 OB Clamp

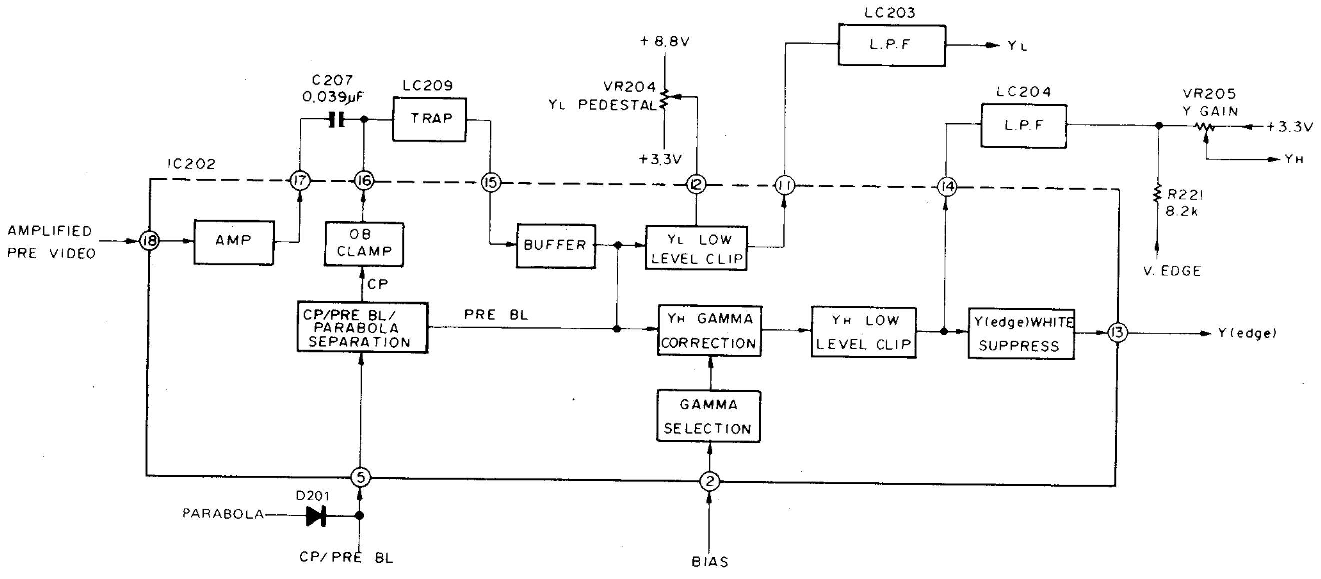

LC203
L.P.F
YL
+8.8V
C207
0.039μF
LC209
TRAP
VR204
YL PEDESTAL
LC204
L.P.F
VR205
Y GAIN
+3.3V
YH
+3.3V
IC202
17
16
15
12
11
14
R221
8.2k
V. EDGE
AMPLIFIED PRE VIDEO
18
AMP
OB CLAMP
BUFFER
YL LOW LEVEL CLIP
CP
CP/PRE BL/ PARABOLA SEPARATION
PRE BL
YH GAMMA CORRECTION
YH LOW LEVEL CLIP
Y(edge)WHITE SUPPRESS
13
Y(edge)
GAMMA SELECTION
5
2
D201
PARABOLA
CP/PRE BL
BIAS

Fig. 5-3-1 Luminance Signal Processing Circuit

### 5-3-2. $Y_H$ Signal Circuit

#### Outline

This circuit receives the luminance (Y) signal from the optical black clamp circuit and generates the luminance ($Y_H$) signal having high frequency response characteristic.

Details

The Y signal undergoes the optical black clamp is fed to trap LC209 which removes the 3.58MHz modulated component and the luminance (Y) signal is obtained. The Y signal is then applied to the buffer inside IC202 through pin 15. The Y signal Ⓓ from the buffer is mixed with the pre BL pulse Ⓔ from the CP/pre BL/Parabola separator and the Y signal Ⓕ is made.

The Y signal is then fed to the gamma correction circuit.

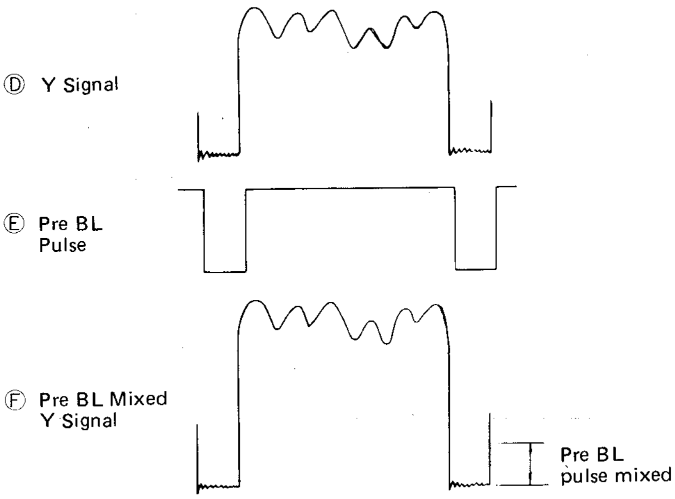


Fig. 5-3-3 Preblanking Mix

- Gamma correction circuit

Outline

This circuit matches the non-linearity of vidicon's photoelectric conversion characteristic to that of cathode ray tube (CRT) and reproduces a linear picture of high fidelity on the monitor.

In order for a televised picture to have the same contrast gradation as the original scene, the system (including the pick-up tube, signal processing inside camera and monitor, and CRT) gamma must be equal to 1.

The gamma characteristic of vidicon is approximately (approx.) 0.65 and the gamma characteristic of the monitor CRT is approx. 2.2, so that the gamma characteristic of the gamma correction circuit should be approx. 0.7, which makes the total gamma to be approx. 1.0 as shown in Fig. 5-3-4.

Details

The Y signal mixed with the pre BL pulse is fed to the gamma (γ) correction circuit and undergoes the gamma correction. The suppression level and the extent of suppression for the gamma correction are selected by the gamma select circuit inside IC202, which is controlled by the DC voltage at pin 2 of IC202.

The Y signal Ⓖ which undergoes the gamma correction is supplied to the low level clip circuit inside IC202, where the low level preblanking portion of the signal is clipped Ⓗ and its pedestal level is set.

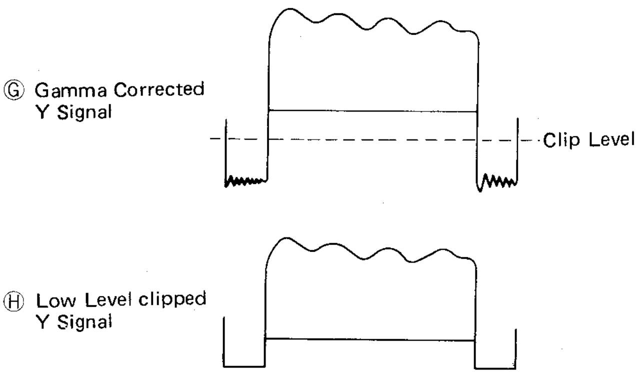


Fig. 5-3-5 Low Level Clip

The Y signal whose pedestal level is set is supplied to 2.8MHz low pass filter LC204, where the frequency response of Y signal is limited to 2.8MHz and its phase is delayed to match the chrominance signal, and the $Y_H$ signal having high frequency response characteristic is generated.

The $Y_H$ signal is then mixed with the vertical edge signal supplied from vertical edge signal generator circuit through R221.

After its level is set by VR205 (Y GAIN), the $Y_H$ signal is supplied to the horizontal aperture signal circuit through the buffer connected between pin 16 and pin 17 of IC203.

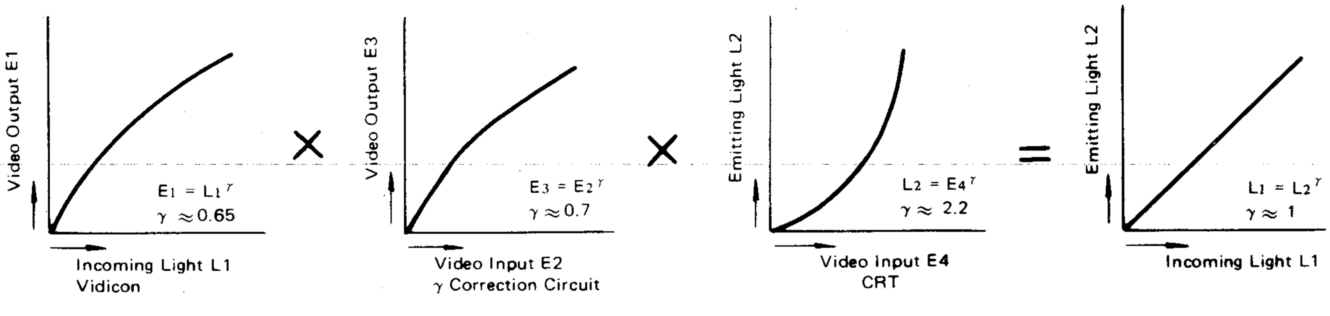


Fig. 5-3-4 Gamma Correction

### 5-3-3. $Y_L$ Signal Circuit

Outline

This circuit receives the luminance (Y) signal from the Y signal circuit, and generates the luminance ($Y_L$) signal having low frequency response characteristic.

Details

The Y signal Ⓘ mixed with the preblanking (pre BL) pulse is fed to the low level clip circuit inside IC202, where the Y signal's low level preblanking portion is clipped and its pedestal level is set (Ⓙ). The clip level (pedestal level) is set by VR204 ($Y_L$ PEDESTAL).

The Y signal Ⓙ whose pedestal level is set is fed through pin 11 of IC202 to the 0.5MHz low pass filter IC203, where the frequency response of Y signal is limited to 0.5MHz.

The Y signal whose bandwidth is 0.5MHz is supplied to buffer Q208 as a luminance ($Y_L$) signal having low frequency response characteristic.

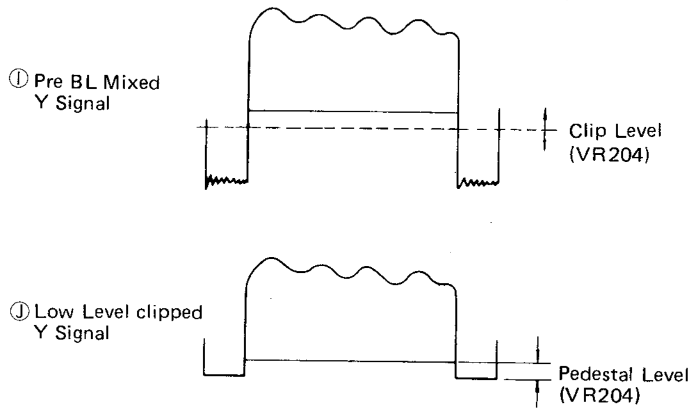


Fig. 5-3-6 Pedestal Level

### 5-3-4. Y(edge) Signal Circuit

Outline

This circuit generates the luminance [Y(edge)] signal for making the vertical edge signal.

Details

The Y signal whose pedestal is set by the $Y_H$ low level clip circuit in IC202 is fed to the Y (edge) white suppress circuit inside IC202, where the high level of Y signal is suppressed and the luminance signal for making the vertical edge signal is obtained. This signal is fed through pin 13 of IC202 to the vertical edge signal generator circuit.

## 5-4. Automatic Iris Control(AIC) Circuit

Outline

This circuit controls the lens iris opening according to the incoming light intensity. This circuit generates the DC voltage corresponding to the light intensity and sends this DC voltage to the automatic iris control (AIC) lens to drive iris mechanism.

The lens iris is closed when the power is turned OFF for vidicon protection.

Details

The parabola signal Ⓐ separated from the CP/pre BL/parabola mixed signal is supplied to the modulator circuit inside IC202 from the CP/pre BL/parabola separator.

The Y signal Ⓑ whose pedestal level is set is fed from the $Y_H$ low level clip circuit to the modulator circuit, where the Y signal is modulated by the parabola signal. To drive the lens iris by the signal corresponding to the center image, the Y signal Ⓑ is modulated by the parabola signal Ⓐ.

The modulated Y signal Ⓒ is peak-rectified in the modulator and converted into DC voltage corresponding to the Y signal level i.e., the incoming light intensity.

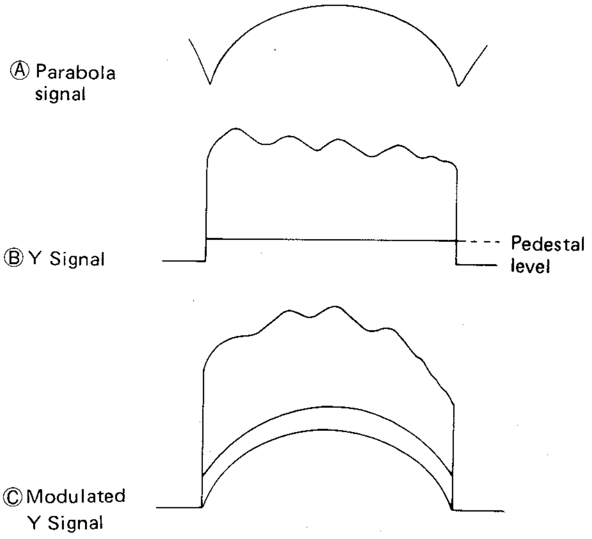


Fig. 5-4-1 Modulation Signal for AIC

This DC voltage is fed to the inverted input of DC amplifier, where it is amplified. The amplified DC voltage is then fed through pin 9 of IC202 and terminal No. 4 of CN204 to the AIC motor to drive it.

If the incoming light intensity goes down, the modulated Y signal level decreased so that the DC voltage which is obtained by rectifying the Y signal also goes down. When an decreasing DC voltage is applied to the inverted input of amplifier, the output from amplifier increases. This output is applied to motor to open the lens iris.

When the incoming light intensity increases, reverse operation takes place.
In this way, the incoming light to the pick-up tube and pre-amplifier output level are maintained constant.

When the incoming light intensity is extremely low, and the lens iris becomes wide open, the automatic gain control (AGC) circuit in IC201 starts to operate. (Refer to AGC circuit on page 25.)
When the light intensity changes and the iris control motor is operated, the electromotive force appears in the motor damper coil connected between terminal No. 3 of CN204. The DC current from the damper coil is negatively fed back to the inverted input of amplifier through terminal No. 3 of CN204, amplifier IC209 (1/2) and pin 8 of IC202 to damp the unwanted iris hunting due to changes in light intensity.
The DC voltage set by VR215 (AIC SET) is applied to the inverted input of amplifier IC209(½) and pin 8 of IC202 for adjusting the amplitude of amplifier inside IC202 and setting the normal iris stop at the standard light intensity.
When the power switch is turned OFF, the regulated +3.3V which is generated in IC202 and supplied to the motor through terminal No. 1 of CN204 falls to zero and the lens iris is closed mechanically.
The regulated +3.3V is fed to other circuits in the Process circuit board as a sub-power source.
The circuit which consists of Q10 and D10 in IC210 and is connected to the non-inverted input of amplifier IC209(1/2) is the AIC start delay circuit.

## 5-5. AIC Start Delay Circuit

### Outline

The automatic iris control (AIC) circuit generates the DC voltage corresponding to the Y signal and controls the iris opening of the lens with the DC voltage.
However, it takes some time for the cathode of the vidicon to be heated sufficiently in order to emit electrons at full force after turning ON the power switch. Therefore, the output signal of the vidicon is gradually resolved from its low signal level.
When the power switch is turned ON, the output signal of the vidicon is very low and the iris of AIC lens is wide open. At this time, if the camera is pointed at an extremely bright object, the bright image may "burn" the vidicon target.
Also, after turning ON the power switch, the camera initially produces an unnatural green color since the red(R) and blue(B) modulated components are riding on top of the green signal, and the R and B signals are resolved last.
The AIC start delay circuit generates the DC voltage for closing the lens iris initially after power turn ON.

### Details

When the power switch is initially turned ON, +6V is applied to the emitter of Q10 in IC210 and Q10 is switched ON due to the surge current flowing into C221. When Q10 is switched ON, +6V at its collector is fed to the non-inverted input pin 5 of IC209.
The amplified output from IC209 is supplied to the automatic iris control (AIC) driver inside IC202 through pin 8 to close the lens iris. This state lasts approximately 15 seconds until C221 is fully charged and Q10 is switched OFF. When Q10 is switched OFF, the lens iris is controlled by the DC voltage corresponding to the incoming light intensity.
In this way, the lens iris is closed during the initial period after the power switch is turned ON in order to prevent the vidicon from burning and avoid unnatural green color in the highlights.

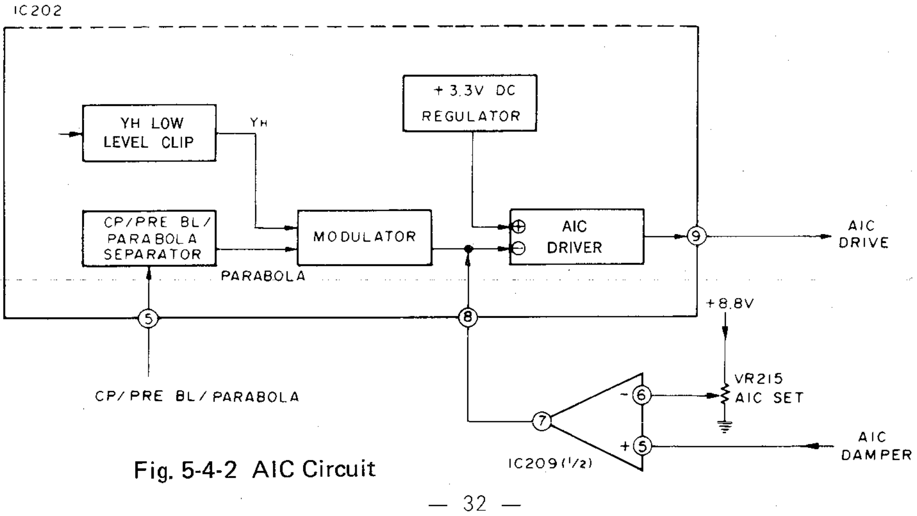


Fig. 5-4-2 AIC Circuit

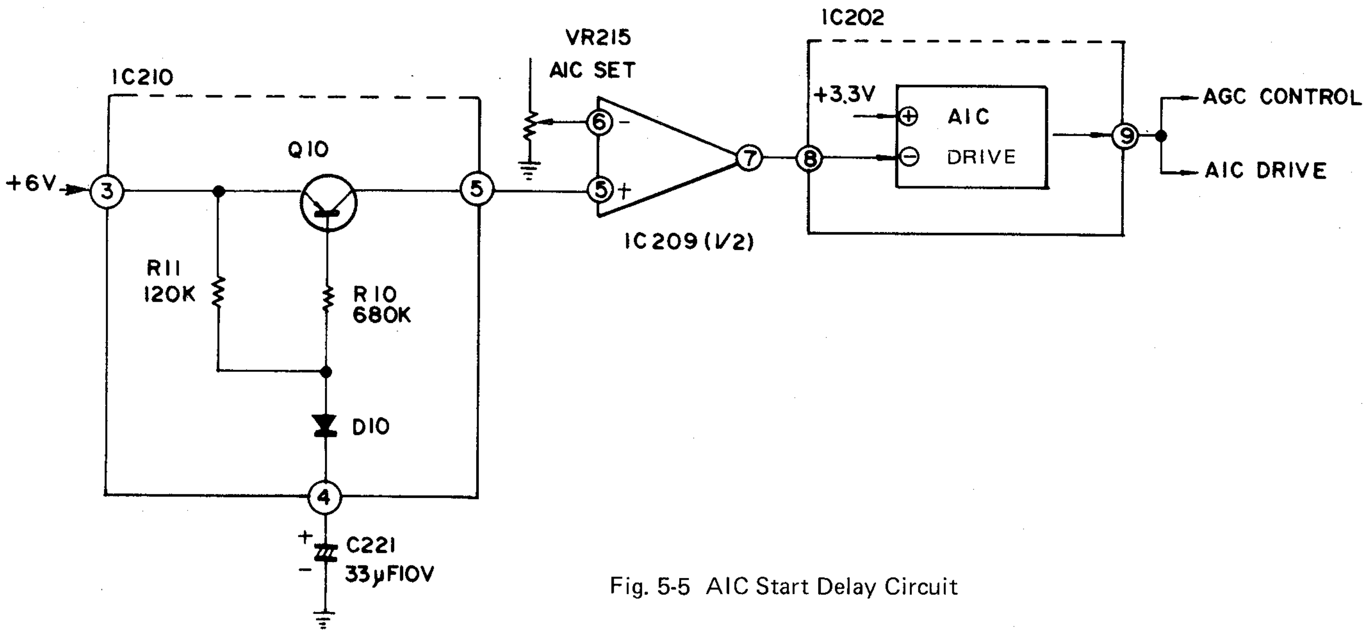

IC210
+6V
3
Q10
5
R11
120K
R10
680K
D10
4
C221
33μF10V
VR215
AIC SET
6
5
7
IC209 (1/2)
IC202
+3.3V
8
AIC
DRIVE
9
AGC CONTROL
AIC DRIVE

Fig. 5-5 AIC Start Delay Circuit

### 5-6. Horizontal Aperture Signal Generator Circuit

Outline

This circuit generates the horizontal edge (aperture) signal to enhance the horizontal resolution.

Details

The luminance ($Y_H$) signal having high frequency response is fed from the $Y_H$ signal circuit to buffer inside IC203 through pin 16.

When the camera is aimed at an object Ⓐ for example, signal Ⓑ passed through pin 18 of IC203, signal Ⓒ delayed 0.2μsec. by delay line LC205 and amplified in the H. aperture generator circuit and signal Ⓓ which results from the delayed $Y_H$ signal being reflected back through LC205 and delayed again (0.4μsec.) appear at the output of the aperture generator where they are mixed in fixed proportions to make up the horizontal (H) aperture signal Ⓔ (Fig. 5-6-1).

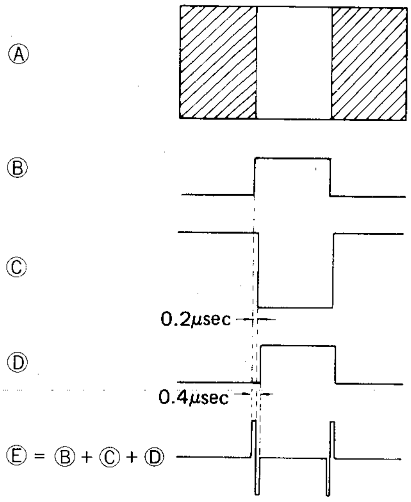

Ⓐ
Ⓑ
Ⓒ
0.2μsec
Ⓓ
0.4μsec
Ⓔ = Ⓑ + Ⓒ + Ⓓ

Fig. 5-6-1 Horizontal Aperture Signal

The H. aperture signal obtained in this way is applied through pin 3 of IC203 and pin 7 of IC205 to the H. aperture noise coring/suppress circuit, where the noise mixed in the H. aperture signal Ⓕ is removed Ⓖ.

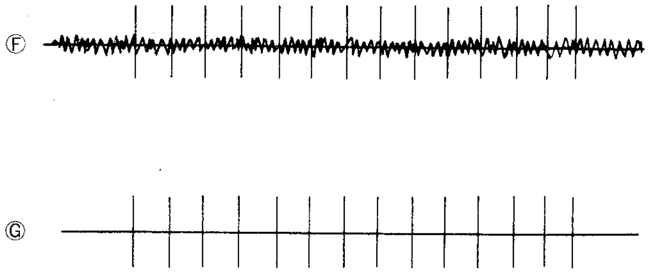


Fig. 5-6-2 H. Aperture Noise Corning

The H. aperture signal which undergoes the noise coring/suppress circuit is then supplied through pin 8 of IC205 to mixing amplifier Q204, where it is mixed with the chrominance signal.

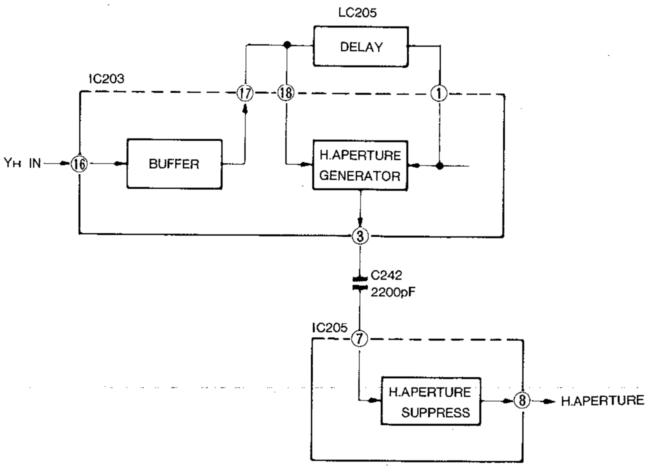

LC205
DELAY
IC203
17
18
1
YH IN
16
BUFFER
H.APERTURE GENERATOR
3
C242
2200pF
IC205
7
H.APERTURE SUPPRESS
8
H.APERTURE

Fig. 5-6-3 H. Aperture Signal Generator Circuit

## 5-7. Vertical Edge Signal Generator Circuit

### Outline

This circuit generates a vertical edge signal for increasing the vertical resolution by enhancing vertical edge contrast.

### Details

The luminance [Y(edge)] signal for making the vertical (V) edge signal supplied from the Y(edge) signal circuit through pin 13 of IC202 is fed to pin 1 of IC206 through VR230 (V. EDGE BALANCE). This Y(edge) signal modulates the subcarrier signal which is applied from the pulse distribution circuit to pin 3 of IC206.

The modulated signal from pin 7 of IC206 is sent to the glass delay line DL202 which delays the input signal by 1H line.

The 1H-delayed modulated signal is detected by the full-wave detector circuit consisting of T201, Q215 and Q216. The delayed Y(edge) signal Ⓑ from the emitters of Q215 and Q216 is fed to the base of Q210, where it is mixed with the undelayed Y(edge) signal Ⓐ applied to the emitter of Q210 to form a vertical edge signal Ⓒ at the collector.

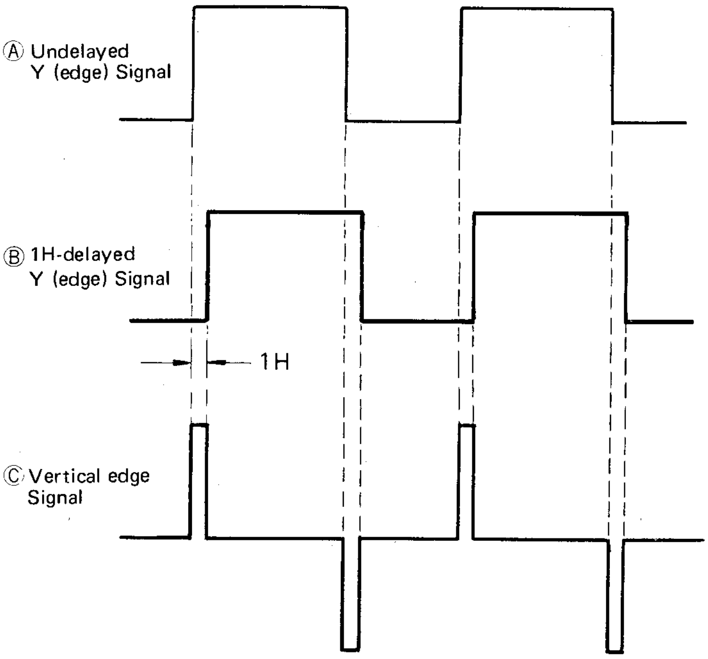


Fig. 5-7-1 Vertical Edge Signal

The vertical edge signal is sent to the low pass filter LC210 where the 4.43MHz and its harmonics are removed. The vertical edge signal from the low pass filter is sent via the output amplifier, consisting of Q211 – Q214, to the vertical transient spurious correction circuit inside IC204, and to the YH signal circuit where it is mixed with the YH signal.

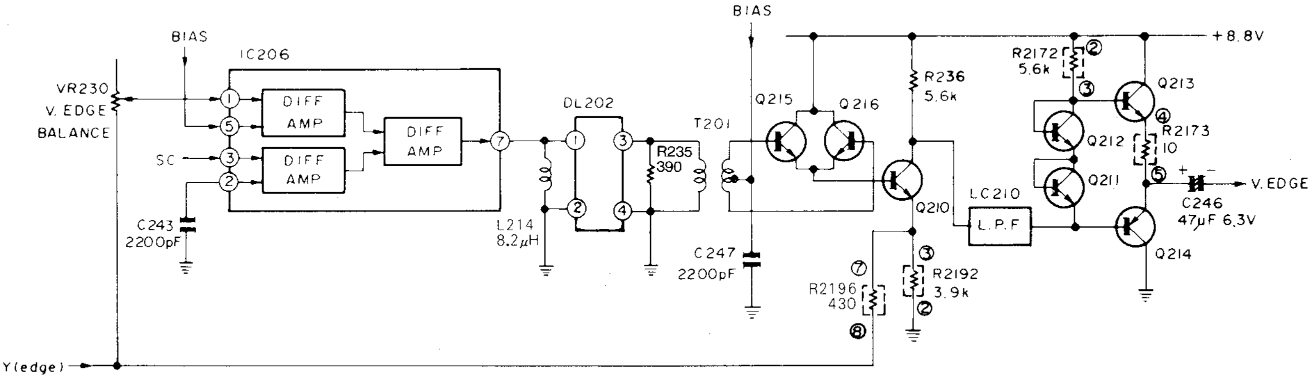

BIAS
IC206
VR230
V. EDGE
BALANCE
SC
①
⑤
③
②
DIFF AMP
DIFF AMP
DIFF AMP
⑦
C243
2200pF
DL202
L214
8.2μH
R235
390
T201
BIAS
C247
2200pF
Q215
Q216
Q210
R236
5.6k
R2196
430
R2192
3.9k
LC210
L.P.F
R2172
5.6k
Q213
Q212
Q211
Q214
R2173
10
C246
47μF 6.3V
+8.8V
V. EDGE
Y(edge)

Fig. 5-7-2 V. Edge Signal Generator Circuit

## 5-8. Red and Blue Separation & Chroma Processing Circuit.

This circuit consists of the red and blue separation circuit, the vertical transient spurious correction circuit, the shading correction circuit, the tracking correction circuit, the red signal detection circuit and the blue signal detection circuit.

### 5-8-1. Red and Blue Separation Circuit

Outline

This circuit takes out the modulated red(Rc) and blue(Bc) signals from the combined preamplifier output signal which is composed of a green(G) signal mixed with 3.58MHz modulated red(Rc) and blue(Bc) signals.

Details

The amplified pre-video signal Ⓐ obtained at pin 17 of IC202 is fed to 3.58MHz band pass filter (BPF) LC202 where the Rc/Bc signal Ⓑ is detected.

The detected Rc/Bc signal is then supplied to the 90° phase shifter Q202 through VR203 (Rc/Bc GAIN), the Rc/Bc amplifier inside IC202, C231 and VR206 (Rc/Bc SEPARATION-2). The 90° phase-shifted Rc/Bc signal Ⓒ obtained at the junction point of VC201 (Rc/Bc SEPARATION-1) and R252 is then applied to the Rc/Bc separation circuit inside IC204 through pin 18. VC201 is a control for shifting the phase of Rc/Bc signal by 90°.

The Rc/Bc signal Ⓑ at pin 3 of IC202 is also supplied to 1/2H delay line DL201(1/2) where it is delayed a half horizontal line (32μsec). The 1/2H-delayed signal is then fed to another 1/2H delay line DL201(1/2) through amplifier Q203. (Q203 is used for matching the impedance between two 1/2H delay lines.)

The inverted 1H-delayed Rc/Bc signal Ⓓ obtained at the junction point of C229 and R263 is supplied to the vertical transient spurious correction circuit inside IC204 via pin 17. (The vertical transient spurious correction will be described later.) The Rc/Bc signal undergoes the vertical transient spurious correction is supplied to the Rc/Bc separation circuit.

In the Rc/Bc separation circuit, the 90° phase-shifted Rc/Bc signal Ⓒ and the inverted 1H-delayed Rc/Bc signal Ⓓ are added forming the Rc signal Ⓔ, and the Rc/Bc signal Ⓒ and the Rc/Bc signal Ⓓ are subtracted each other forming the Bc signal Ⓕ.

The Rc and Bc signals are fed to the respective shading/tracking correction circuits.

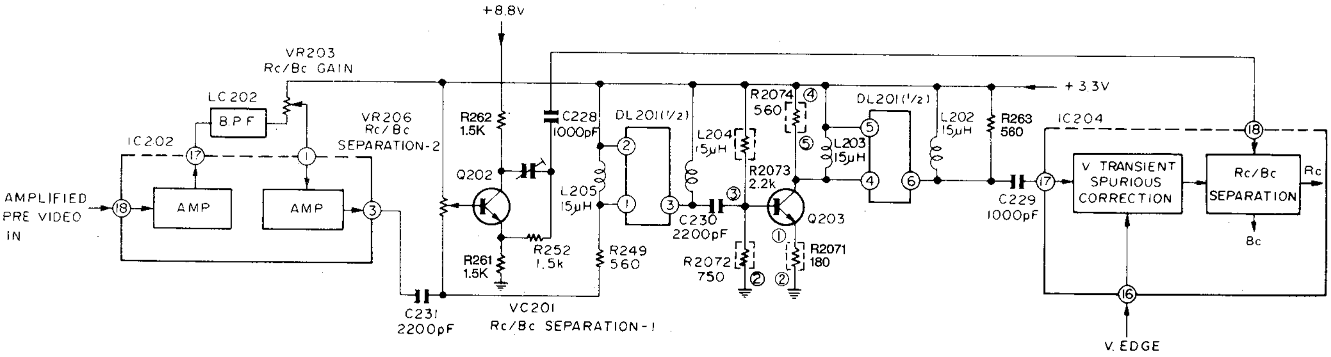

+8.8V
VR203
Rc/Bc GAIN
LC202
B.P.F
IC202
⑰
①
VR206
Rc/Bc
SEPARATION-2
AMPLIFIED
PRE VIDEO
IN
⑱
AMP
AMP
③
R262
1.5K
C228
1000pF
Q202
DL201(1/2)
②
L205
15μH
①
③
R261
1.5K
R252
1.5k
R249
560
C231
2200pF
VC201
Rc/Bc SEPARATION-1
L204
15μH
C230
2200pF
R2072
750
R2074
560
④
⑤
R2073
2.2k
③
Q203
①
R2071
180
②
②
DL201(1/2)
⑤
L203
15μH
④
⑥
L202
15μH
R263
560
+3.3V
IC204
⑱
C229
1000pF
⑰
V TRANSIENT
SPURIOUS
CORRECTION
Rc/Bc
SEPARATION
Rc
Bc
⑯
V. EDGE

Fig. 5-8-1 R/B Separation Circuit

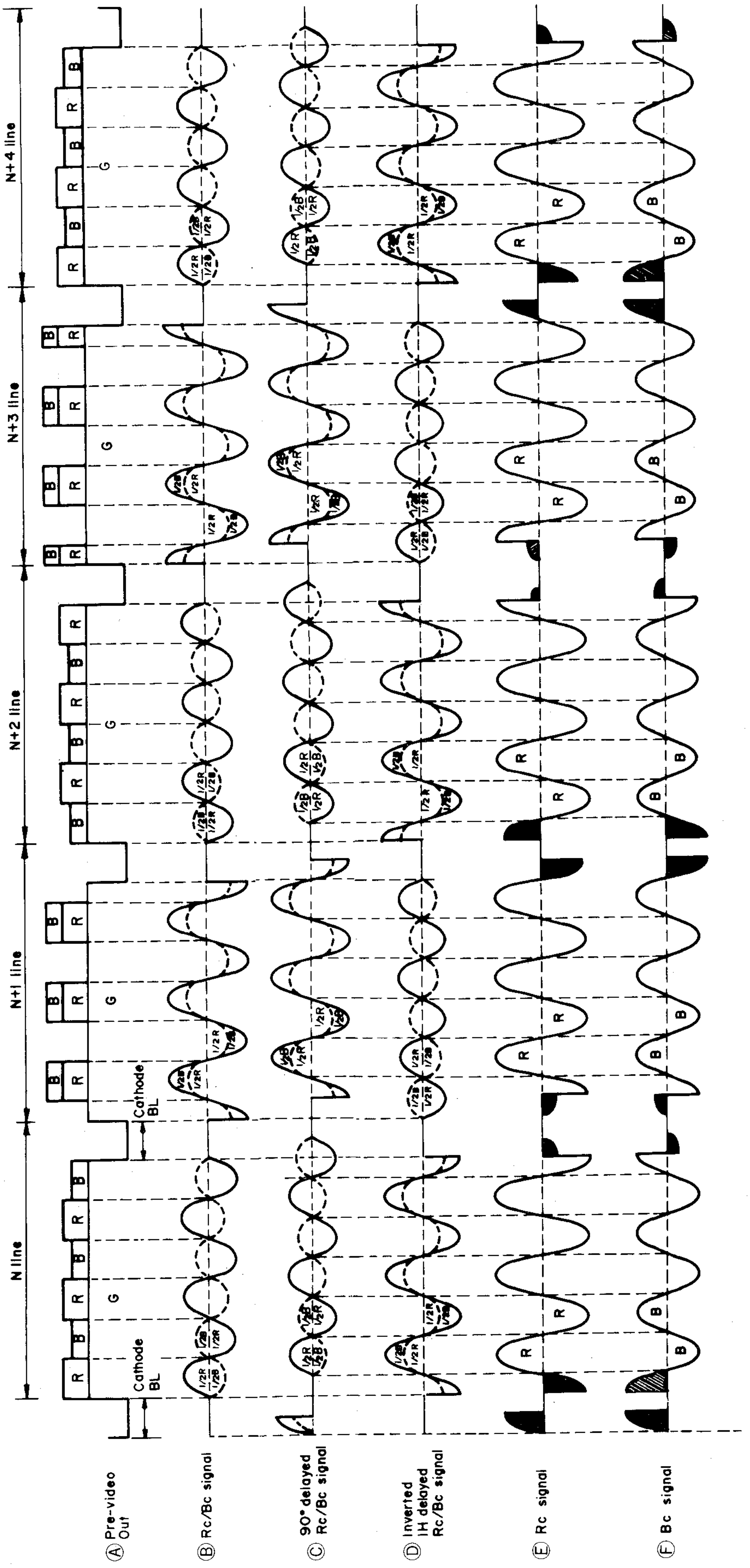

N line
N+1 line
N+2 line
N+3 line
N+4 line
Cathode BL
Cathode BL
R
B
G
1/2R
1/2B
Ⓐ Pre-video Out
Ⓑ Rc/Bc signal
Ⓒ 90° delayed Rc/Bc signal
Ⓓ Inverted 1H delayed Rc/Bc signal
Ⓔ Rc signal
Ⓕ Bc signal

Fig. 5-8-2 Rc/Bc Signal Separation

### 5-8-2. Vertical Transient Spurious Correction Circuit

**Outline**

As described previously, the Rc and Bc signals are separated from each other by addition and subtraction of the one line (1H) delayed Rc/Bc signal and the phase shifted Rc/Bc signals but not delayed.

When a pattern such as shown in Fig. 5-8-3 is seen by the camera, the Rc/Bc signal which is not delayed appears as in Ⓘ in Fig. 5-8-4, and the Rc/Bc signal delayed one line (1H) becomes as in Ⓙ.

Therefore, it is impossible to secure vertical correlation between Rc/Bc signals of N+1 line, and a "spurious signal" differing in level of Rc and Bc signals against Y signal Ⓗ is generated, and the vertical (V) edge of the object is unnaturally colored by this "spurious signal".

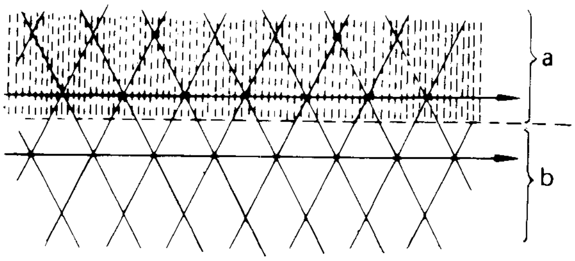
The vertical transient spurious correction circuit controls the amplitude of 1H-delayed Rc/Bc signal Ⓙ corresponding to N+1 line with vertical (V) edge signal Ⓚ and the signal Ⓛ is made. This provides vertical correlation between Rc/Bc signals Ⓘ and Ⓛ prior to color separation.

**Details**

The vertical edge signal Ⓚ in Fig. 5-8-4 is sent from the vertical edge signal generator circuit to the vertical transient spurious correction circuit inside IC204 through pin 16.

In this circuit, those parts of the 1H-delayed Rc/Bc signal Ⓙ which do not correlate with the Rc/Bc signal Ⓘ (not 1H-delayed) are controlled in level by the vertical edge signal Ⓚ.

The corrected Rc/Bc signal Ⓛ is fed to the Rc/Bc separation circuit inside IC204.



a : Dark object
b : Bright object

Fig. 5-8-3

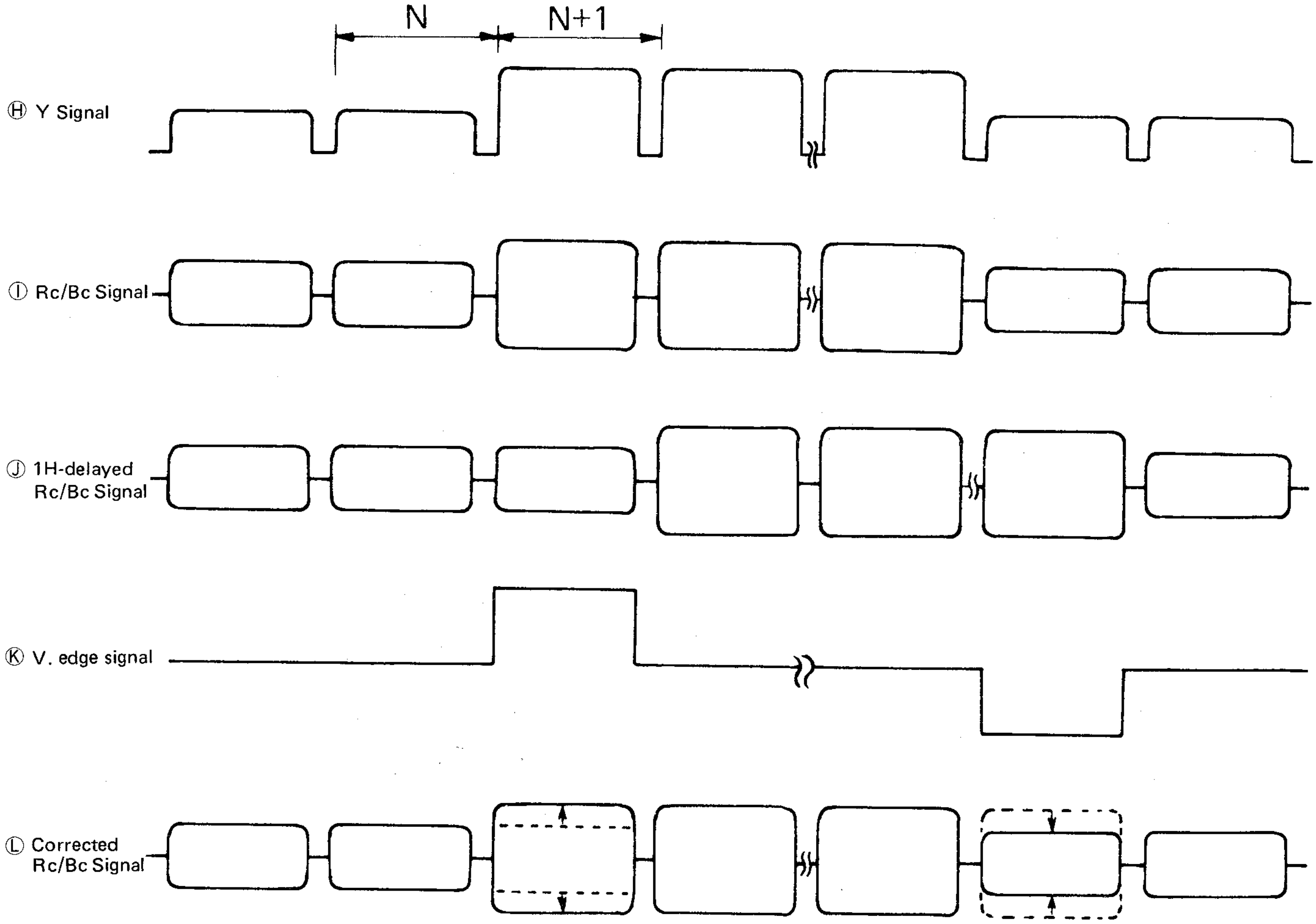


Fig. 5-8-4 Vertical Transient Spurious Correction

### 5-8-3. Shading Correction Circuit

#### Outline

Even when dynamic focus is applied to grid-4(G4) of pick-up tube, the non-uniformity of modulation due to uneven focus on the target cannot be completely eliminated.

Modulation non-uniformity also occurs due to non-uniform structure in the photoconductive layer of the pick-up tube (manufacture tolerance).

The shading correction circuit compensates for residual picture shading using horizontal (H) and vertical (V) sawtooth and parabola signals generated in the Deflection circuit board.

#### Details

- **Red shading correction**

The vertical parabola and sawtooth, and horizontal parabola and sawtooth signals which are applied from the Deflection circuit board are supplied to the wiper arms of VR208 (R-V.PARA), VR209 (R-V.SAW), VR210 (R-H.PARA) and VR211 (R-H.SAW).

These signals are fed to both the inverted (pin 2) and non-inverted input (pin 3) of amplifier IC208(1/2), where they are mixed and amplified. The output of IC208 at pin 1 produces a positive or negative shading correction signal depending on the position of these controls.

The shading correction signal adjusted by VR208 – VR211 is forwarded to the shading/tracking correction circuit inside IC204 through pin 3, where it modulates the modulated red(Rc) signal for correcting the signal shading.

Suppose a uniformly illuminated white object is seen by the camera and the Rc signal has a shading (unevenness of amplitude) such as that shown in Fig. 5-8-5 Ⓜ. This is sent to the shading/tracking correction circuit from the Rc/Bc separation circuit inside IC204. In this case, the four red shading controls are adjusted to generate the shading correction signal Ⓝ at pin 1 of IC208, and it is applied to the correction circuit. The Rc signal Ⓜ is modulated by the shading correction signal Ⓝ and the corrected signal Ⓞ is produced. The shading correction signal mixed with the Rc signal Ⓞ is removed in the correction circuit and the Rc signal Ⓟ is obtained.

In this way, the shading of the Rc signal is corrected.

The corrected Rc signal is then fed to the red signal detection circuit inside IC204.

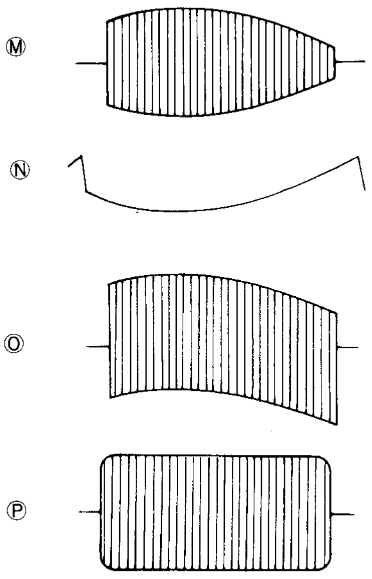


Fig. 5-8-5 Shading Correction

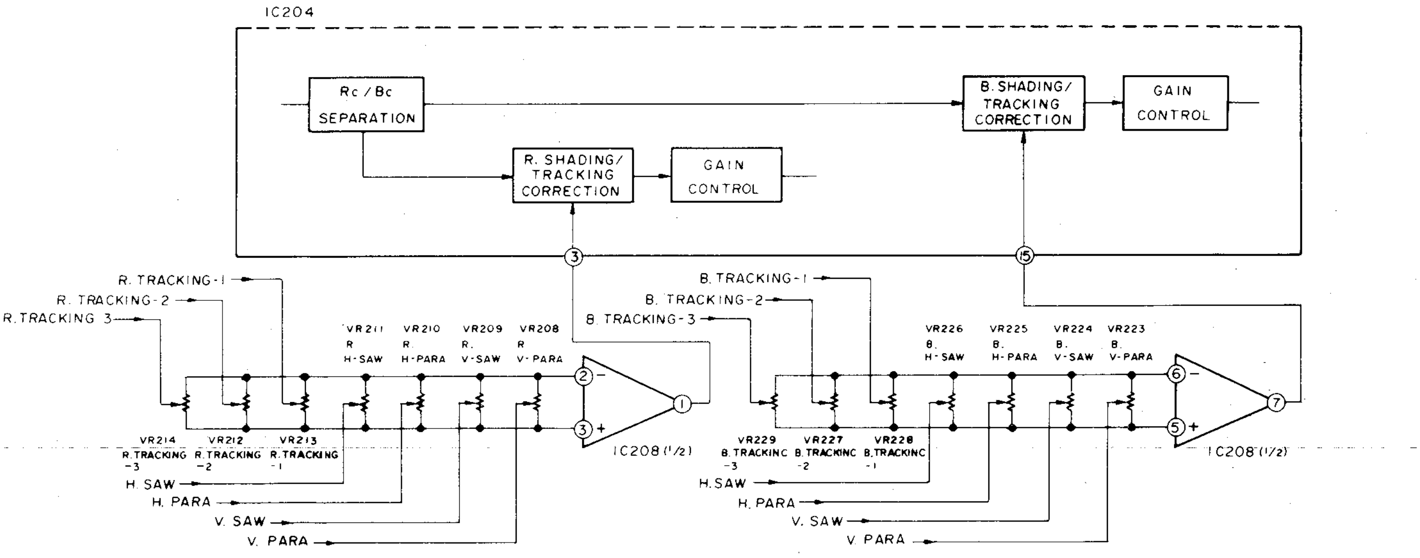

IC204
Rc / Bc SEPARATION
R. SHADING/ TRACKING CORRECTION
GAIN CONTROL
B. SHADING/ TRACKING CORRECTION
GAIN CONTROL
③
⑮
R. TRACKING-1
R. TRACKING-2
R.TRACKING 3
VR211 R H-SAW
VR210 R. H-PARA
VR209 R. V-SAW
VR208 R V-PARA
②
③
①
IC208 (1/2)
VR214 R.TRACKING -3
VR212 R.TRACKING -2
VR213 R.TRACKING -1
H. SAW
H. PARA
V. SAW
V. PARA
B. TRACKING-1
B. TRACKING-2
B. TRACKING-3
VR226 B. H-SAW
VR225 B. H-PARA
VR224 B. V-SAW
VR223 B. V-PARA
⑥
⑤
⑦
IC208 (1/2)
VR229 B.TRACKINC -3
VR227 B.TRACKINC -2
VR228 B.TRACKINC -1
H.SAW
H. PARA
V. SAW
V. PARA

Fig. 5-8-6 Shading/Tracking Correction Circuit

- **Blue shading correction**

As in the case of red shading correction, the vertical and horizontal parabola and sawtooth signals supplied to the wiper arms of VR223 (B-V.PARA), VR224 (B-V.SAW), VR225 (B-H.PARA) and VR226 (B-H.SAW) are fed to both the inverted (pin 6) and non-inverted (pin 5) input of IC208(1/2).

The positive or negative shading correction signal obtained at pin 7 of IC208 is fed to the blue shading/tracking correction circuit through pin 15 of IC204, where it modulates the modulated blue (Bc) signal (supplied from the Rc/Bc separation circuit) for the shading correction.
The shading-corrected Bc signal is then applied to the blue signal detection circuit inside IC204.

### 5-8-4. Tracking Correction Circuit

Outline
This circuit corrects the characteristic of linearity for R and B signals using the tracking signals generated in the tracking signal generator circuit, and tracks the R and B signals with the $Y_L$ signal. (Refer to tracking signal generator circuit on page 27).

Details
The tracking-1 signal Ⓠ and the tracking-2 signal Ⓡ which are generated in the tracking-1 and 2 signal generator circuit in IC201 are fed to the wiper arms of VR213 (R.TRACKING-1) and VR212 (R.TRACKING-2) through pin 9 and pin 8 respectively.
The tracking-3 signal Ⓢ which is generated in the tracking-3 signal generator in IC201 is forwarded to the VR214 (R.TRACKING-3) via pin 11.
These signals are applied to both the inverted (pin 2) and non-inverted (pin 3) input of amplifier IC208(1/2), where they are mixed and amplified. The positive or negative red tracking correction signal is produced at pin 1 of IC208 depending upon the position of these controls.
The correction signal is then fed to the red shading/tracking correction circuit through pin 3 of IC204, where it modulates the Rc signal Ⓣ comes from the Rc/Bc separation circuit for correcting the linearity of Rc signal Ⓤ. In this way, the R signal matches the $Y_L$ signal.
VR213 corrects the relatively low level of R signal, VR212 for the relatively high level, and VR214 for the highest level (Fig. 5-8-8).

The tracking correction for the B signal is similarly done with VR228 (B.TRACKING-1), VR227 (B.TRACKING-2), VR229 (B.TRACKING-3), IC208(1/2) and the blue tracking correction circuit inside IC204.

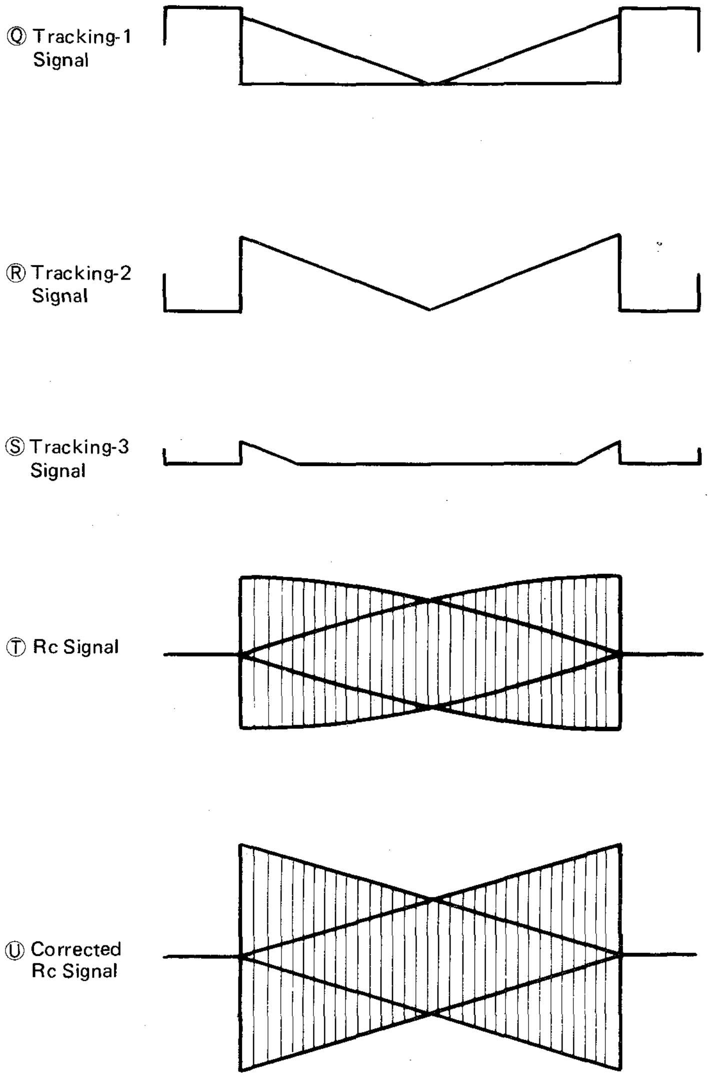


Fig. 5-8-7 Tracking Correction-1

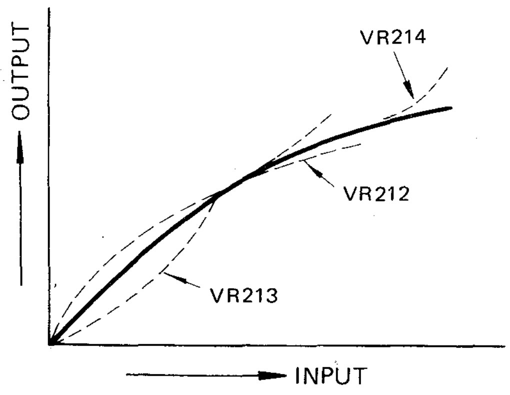


Fig. 5-8-8 Tracking Correction-2

### 5-8-5. Red Signal Detection Circuit

**Outline**

This circuit receives the modulated red(Rc) signal from the red shading/tracking correction circuit, removes the modulation and detects the red video signal.

The red video signal is then supplied to the chrominance encoding circuit.

**Details**

The Rc signal Ⓥ from the red shading/tracking correction circuit is fed through the gain control circuit to the amplifier where it is amplified. The amplified positive Rc signal Ⓦ and negative Rc signal Ⓧ obtained at the output of amplifier are forwarded to the detector.

The detected Rc signal Ⓨ is then fed to the low pass filter (LPF) LC207. The detector which extracts the red signal produces a unwanted 7.16MHz ripple signal Ⓨ. The 7.16MHz component is removed by the LPF leaving only the red signal Ⓩ.

The resultant red signal is fed to the chrominance encoding circuit through buffer Q207.

VR222 (R.GAIN) which is located on the side of the camera is a control for fine adjustment of the red signal gain. VR220 (R.GAIN PRESET) is a red signal level presetting control.

VR207 (R.PEDESTAL) is a control for setting the red pedestal.

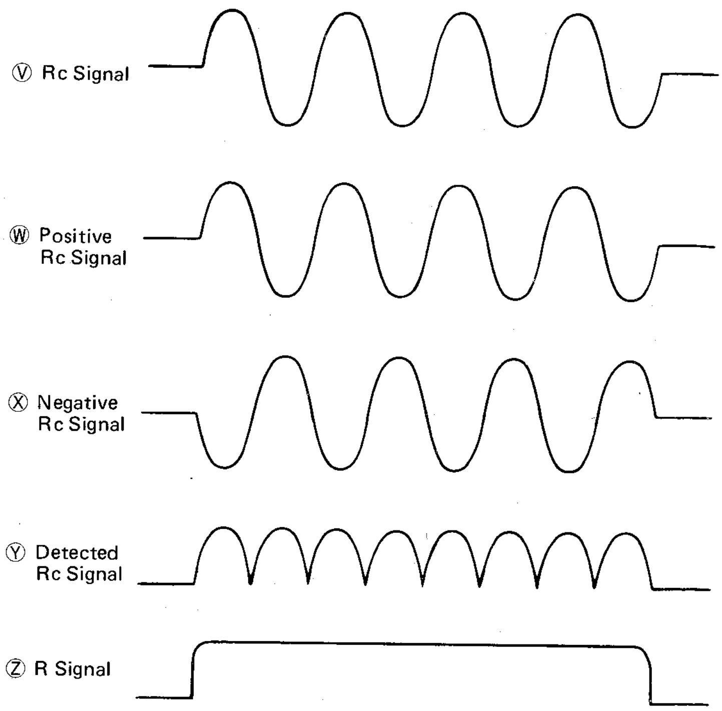


Fig. 5-8-9 Red Signal Detection

The preblanking (pre BL) pulse fed to the amplifier from the pulse distribution circuit removes the noise during the blanking period.

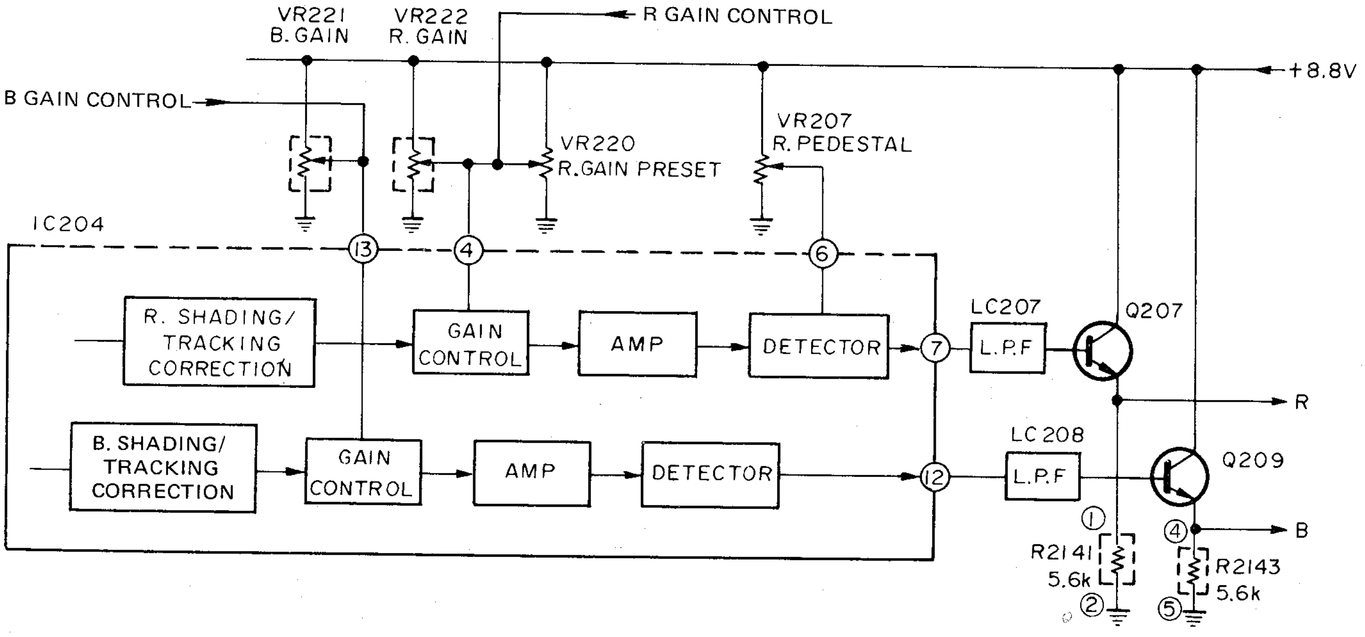

VR221
B.GAIN
VR222
R. GAIN
R GAIN CONTROL
+8.8V
B GAIN CONTROL
VR220
R.GAIN PRESET
VR207
R. PEDESTAL
IC204
⑬
④
⑥
R. SHADING/ TRACKING CORRECTION
GAIN CONTROL
AMP
DETECTOR
⑦
LC207
L.P.F
Q207
R
B. SHADING/ TRACKING CORRECTION
GAIN CONTROL
AMP
DETECTOR
⑫
LC208
L.P.F
Q209
①
R2141
5.6k
②
④
B
R2143
5.6k
⑤

Fig. 5-8-10 R/B Signal Detection Circuit

### 5-8-6. Blue Signal Detection Circuit

Outline

This circuit uses the same design as the red signal detection circuit.

The circuit receives the modulated blue (Bc) signal from the blue shading/tracking correction circuit and converts it to the blue video signal.

The blue video signal is then fed to the chrominance encoding circuit.

Details

The Bc signal from the blue shading/tracking correction circuit in IC204 is sent to the low pass filter (LPF) LC208 after it undergoes the gain control, the amplification and the detection circuits.

The blue video signal obtained by removing the 7.16MHz ripple signal is then applied to the chrominance encoding circuit through buffer Q209.

VR221 (B.GAIN) on the side of the camera is a control for fine adjustment of the blue signal gain.

## 5-9. Chrominance Encoding Circuit

This circuit contains the color reproduction correction circuit, the gamma correction circuit, the chrominance signal generator circuit and the chroma clip/suppression circuit.

### 5-9-1. Color Reproduction Correction Circuit

Outline

This circuit receives the luminance ($Y_L$) signal having low frequency response characteristic, the red signal and the blue signal, and corrects colorimetry imperfection (particularly red and green) resulting from the spectral characteristic of the stripe filter which affects mostly the red and green signals.

Details

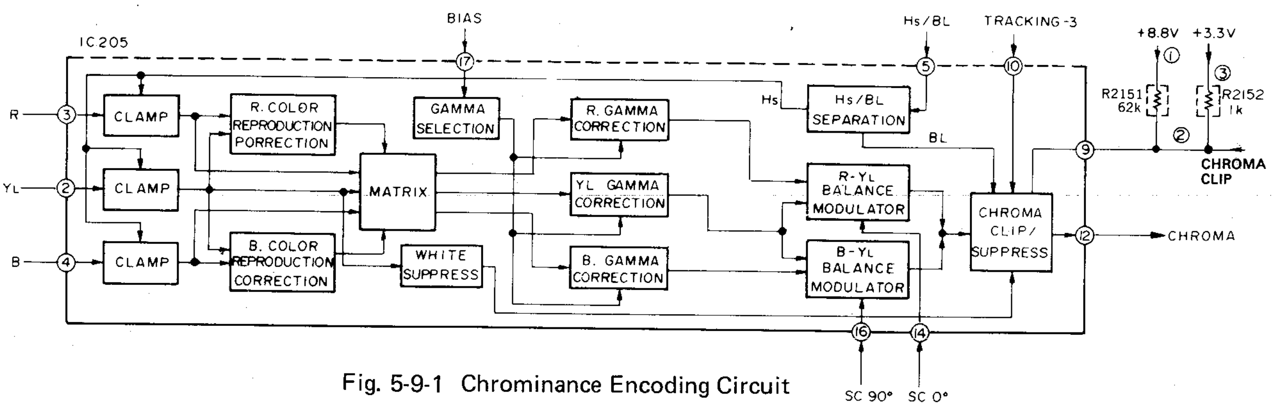
The red(R), blue(B) and $Y_L$ signals obtained at the emitter of buffer Q207, Q209 and Q208 respectively are applied to clamp circuit inside IC205 through pin 3, pin 4 and pin 2. In the clamp circuit, the blanking level of these signals are clamped by the horizontal scanning start(Hs) pulse applied from the Hs/BL separation circuit respectively.

The clamped R, B and $Y_L$ signals are forwarded to the matrix circuit. The R and $Y_L$ signals are also applied to the R.color reproduction correction circuit and they are subtracted each other.

The R-$Y_L$ color difference signal made by the subtraction is supplied to the matrix circuit. The B-$Y_L$ color difference signal obtained by subtracting the B and $Y_L$ signals each other in the B.color reproduction correction circuit is also supplied to the matrix circuit.

The R, B, $Y_L$, R-$Y_L$ and B-$Y_L$ signals undergoes the matrix to generate the corrected R, B and $Y_L$ signals for correcting the color reproduction of red and green image.

When the camera is pointed at a black and white object, the signal level of R, B and $Y_L$ is the same. Therefore, no correction signal is applied to the matrix circuit. However, the camera is pointed at a colored object, the correction signal is generated.



IC205
BIAS
Hs/BL
TRACKING-3
+8.8V
+3.3V
R
YL
B
③
②
④
⑰
⑤
⑩
①
③
②
⑨
⑫
⑯
⑭
CLAMP
CLAMP
CLAMP
R. COLOR REPRODUCTION PORRECTION
B. COLOR REPRODUCTION CORRECTION
MATRIX
GAMMA SELECTION
WHITE SUPPRESS
R. GAMMA CORRECTION
YL GAMMA CORRECTION
B. GAMMA CORRECTION
Hs
Hs/BL SEPARATION
BL
R-YL BALANCE MODULATOR
B-YL BALANCE MODULATOR
CHROMA CLIP/ SUPPRESS
R2151 62k
R2152 1k
CHROMA CLIP
CHROMA
SC 90°
SC 0°

Fig. 5-9-1 Chrominance Encoding Circuit

### 5-9-2. Gamma Correction Circuit

**Outline**

This circuit receives the red(R), blue(B), and $Y_L$ signals from the color reproduction correction circuit.
These signals undergoes the gamma correction and goes to the chrominance signal generator circuit.

**Details**

The R, B and $Y_L$ signals from the matrix circuit are supplied to the gamma($\gamma$) correction circuits respectively and undergoes the gamma correction. (Refer to the gamma correction circuit on page 30.) The suppression level and the extent of suppression are set by the gamma($\gamma$) select circuit which is controlled by the DC voltage at pin 17 of IC205.
The gamma-corrected R, B and $Y_L$ signals are forwarded to the chrominance signal generator circuit.

### 5-9-3. Chrominance Signal Generator Circuit

**Outline**

This circuit matrixes the red(R), blue(B) and $Y_L$ signals to generates the R-$Y_L$ and B-$Y_L$ color difference signals, and modulates these base band color difference signals on two subcarrier differing in phase by 90° to generate a chrominance signal.

**Details**

The R signal from the R gamma correction circuit is fed to the R-$Y_L$ balance modulator circuit. The $Y_L$ signal from the $Y_L$ gamma correction circuit is also supplied to the R-$Y_L$ balance modulator circuit where the R-$Y_L$ color difference signal is made up inside the modulator. The R-$Y_L$ signal modulates the 0° phase subcarrier (R-Y) SC applied to the modulator from the sync distribution circuit through pin 14 of IC205. The modulator produces an AM modulated (suppressed carrier) signal.

Similarly, the B signal and $Y_L$ signal from the B and $Y_L$ gamma correction circuits are fed to the B-$Y_L$ balance modulator circuit respectively. The B-$Y_L$ color difference signal made up in the modulator and the 90° phase shifted subcarrier [its phase is delayed 90° with respect to (R-Y) SC] applied to the modulator through pin 16 of IC205 undergoes suppressed carrier quadrature modulation.
The R-$Y_L$ modulated signal and the B-$Y_L$ modulated signal are added forming the chrominance signal.
The chrominance signal is then forwarded to the low level chroma suppression circuit.

### 5-9-4. Chroma clip/Suppression Circuit

**Outline**

This circuit contains the high Y level chroma clip circuit and low level chroma suppression circuit.
The high Y level chroma clip circuit clips the green color which results when an excessively bright object is shot with the camera. This is caused by the lack of beam in the pick-up tube. When the beam of pick-up tube is insufficient to discharge the target due to excessive light reflected from a brightly illuminated object, the modulated red(R)/blue(B) signal components which riding on top of the green(G) signal become satulated (Ⓐ and Ⓑ). Therefore, the bright picture parts turn into an unnatural green color due to lack of red and blue.

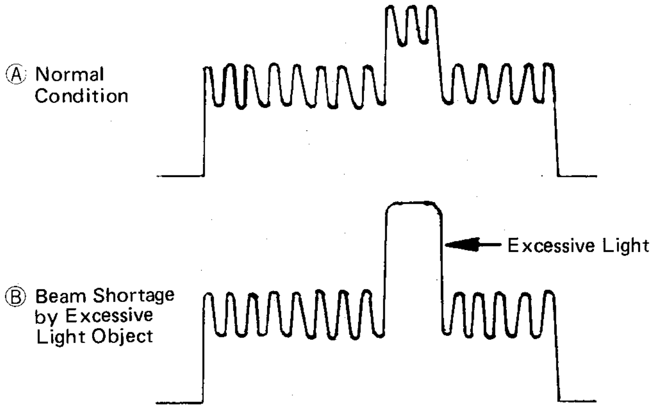


Fig. 5-9-2 Beam Shortage

The low level chroma suppression circuit enchances color reproduction in the low luminance condition by improving the white balance, when the color of the object is faint.

**Details**

The chrominance signal is supplied to the chroma clip/suppression circuit from the R-$Y_L$ and B-$Y_L$ balance modulator circuits.
The tracking-3 signal (high luminance level signal) which is generated in the tracking-3 signal generator circuit in IC201 is fed through pin 10 of IC205 to the chroma clip/suppression circuit. The blanking (BL) pulse is supplied from the Hs/BL separation circuit to the same circuit, where they are mixed forming the high Y level chroma clip signal. The chrominance signal corresponding to the excessive bright object and the BL period is clipped and does not reach the PAL output.
If this circuit is malfunctioning, the bright picture parts would turn into an unnatural green color, and the chroma signal would appear on the blanking period of the PAL signal.

The DC voltage, obtained by dividing the voltage between +8.8V and +3.3V with R2151 and R2152 in BR215 and fed to the chroma clip/suppression circuit via pin 9, determines the clip level of chroma signal.

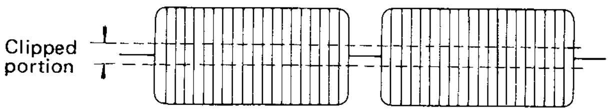


Fig. 5-9-3 Low Level Chroma Suppression

The $Y_L$ signal from the $Y_L$ clamp circuit is applied to the Y(sup) white suppression circuit. The white-suppressed Y(sup) signal is then fed to the chroma clip/suppression circuit together with the DC voltage to suppress the chrominance signal corresponding to the low luminance signal mainly.

The clipped and suppressed chroma signal is then forwarded through pin 12 of IC205 and VR216 (CHROMA GAIN) to the emitter of mixing amplifier Q204 where it is mixed with the H.aperture signal. The mixed signal is then amplified by Q204 and fed to the PAL signal processing circuit.

The chrominance signal at pin 12 of IC205 is also fed to the white balance detection circuit.

## 5-10. White Balance Detection Circuit

### Outline

This circuit rectifies the chrominance signal due to imperfect white balance into a DC voltage, and supplies it to the white balance indicator circuit of the Deflection circuit board as a white balance control DC voltage which controls the vertical position of white balance indicator bar on the CRT screen.

### Details

The chrominance signal from pin 12 of IC205 is fed through C262 and R2231 in BR223 to Q206 where it is peak-rectified and converted into the DC voltage. The DC voltage which corresponds to the condition of white balance and obtained at the junction point of R2233 and R2234 in BR223 is supplied to the white balance indicator circuit of the Deflection circuit board through terminal No. 11 of CN201.

The DC voltage increases during high chrominance leakage and decreases during low chrominance condition.

When the white balance switch on the side of the camera is set to the "CHECK" position, the DC voltage is sent to the Deflection circuit board. When it is set to the upper position, the DC voltage is grounded.

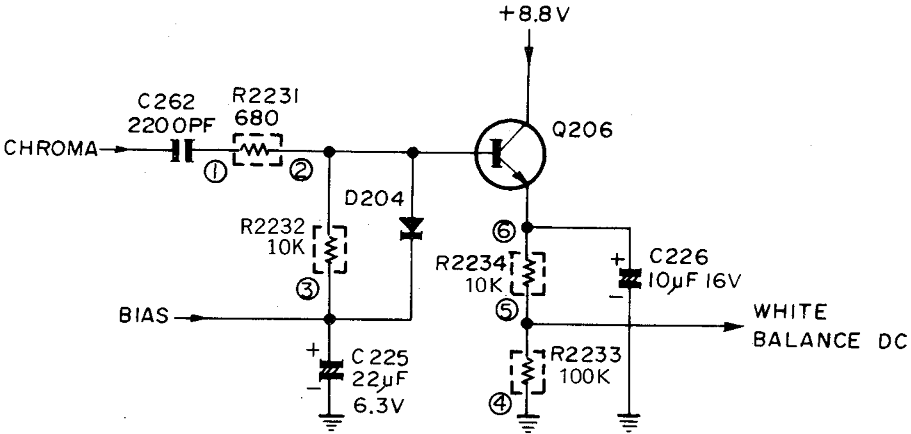


Fig. 5-10

Fig. 5-10 White Balance Detection Circuit

## 5-11. PAL Signal Processing Circuit

### Outline

In this circuit, the chrominance signal, the luminance signal, the burst signal and the sync signal are mixed to produce a composite PAL signal. The PAL signal is applied to the portable VTR, or a table model type VTR through the power supply.

### Details

The mixed signal Ⓐ of the luminance ($Y_H$) signal and the vertical (V) edge signal is fed to amplifier inside IC203 through pin 1. The mixed signal Ⓑ of the chrominance signal and the horizontal (H) aperture signal is supplied to the amplifier through pin 2. In the amplifier, these four signals are mixed and amplified(Ⓒ). The mixed signal Ⓒ is applied to the gain control amplifier, where it is amplified.

The amplified signal is forwarded through pin 13 and pin 12 of IC203 to the clamp circuit, where the blanking level of the amplified signal is clamped by the horizontal scanning start (Hs) pulse applied from the Hs/BL separation circuit in IC203.

The clamped signal is then sent to buffer and mixed with the positive blanking (BL) pulse.

The mixed signal Ⓓ with the BL pulse is supplied to the low level clip circuit and its BL portion is clipped setting the pedestal level.

The clipped signal Ⓔ is applied to the high level clip circuit where the signal exceeds 125IRE unit (0.9V) is clipped.

The mixed signal of chrominance and luminance signal is mixed with the mixing signal Ⓕ of sync pulse and burst signal forming a composite PAL signal Ⓖ.

The PAL signal at pin 9 of IC203 is supplied to the VTR through C219 and R255.

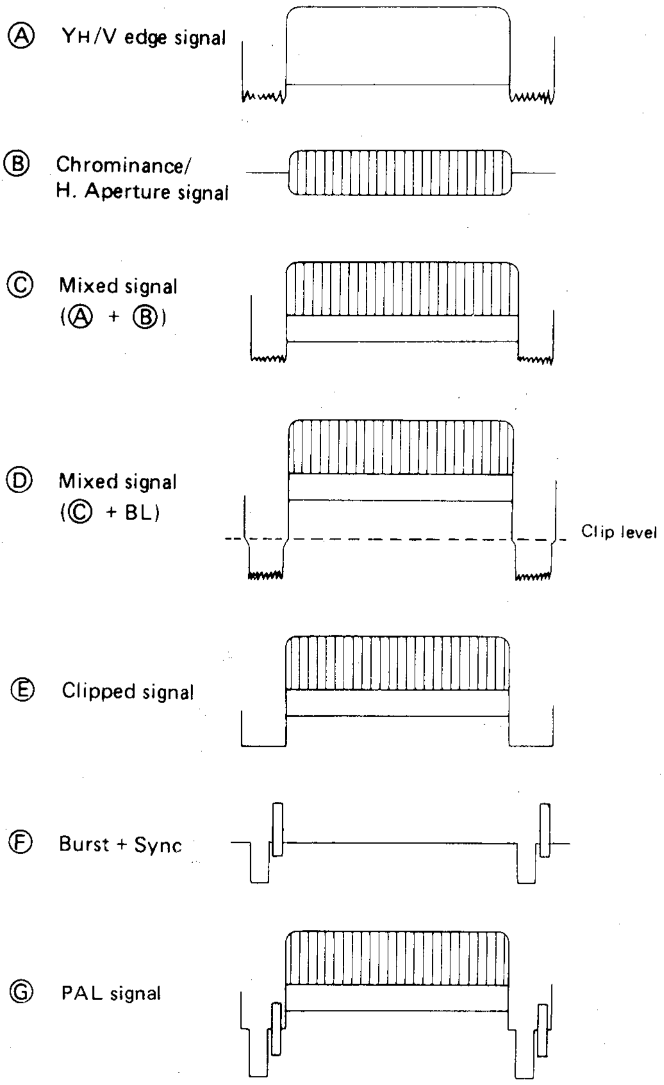

Ⓐ YH/V edge signal
Ⓑ Chrominance/ H. Aperture signal
Ⓒ Mixed signal (Ⓐ + Ⓑ)
Ⓓ Mixed signal (Ⓒ + BL)
Clip level
Ⓔ Clipped signal
Ⓕ Burst + Sync
Ⓖ PAL signal

Fig. 5-11-1 PAL Signal

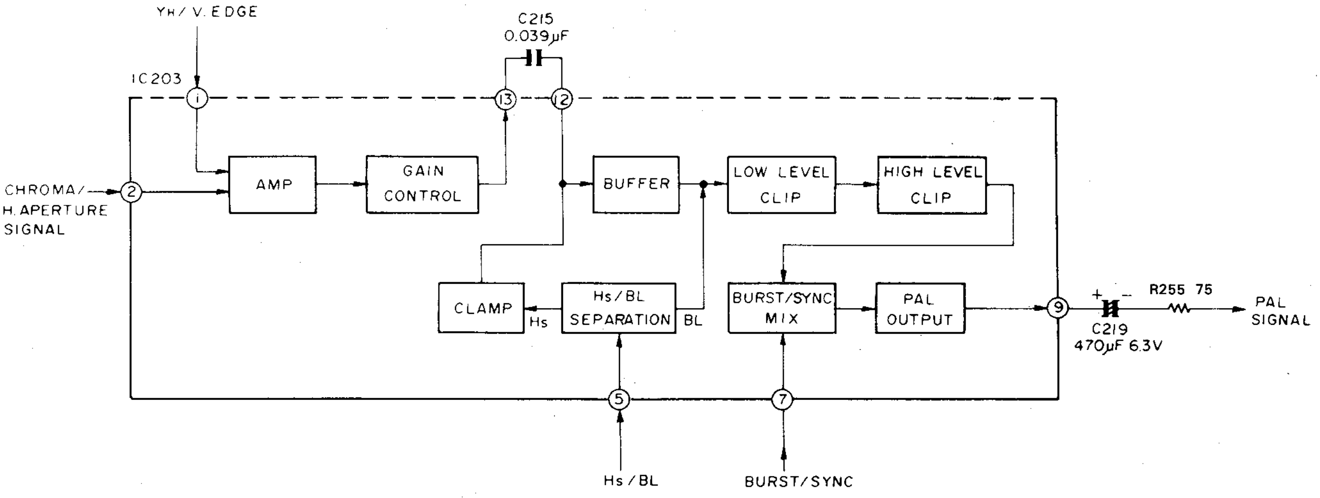

YH/V EDGE
C215 0.039μF
IC203
1
13
12
2
CHROMA/ H.APERTURE SIGNAL
AMP
GAIN CONTROL
BUFFER
LOW LEVEL CLIP
HIGH LEVEL CLIP
CLAMP
Hs
Hs/BL SEPARATION
BL
BURST/SYNC MIX
PAL OUTPUT
9
+ -
R255 75
C219 470μF 6.3V
PAL SIGNAL
5
7
Hs/BL
BURST/SYNC

Fig. 5-11-2 PAL Signal Processing Circuit

## 5-12. Playback Sense Circuit

### Outline

This circuit senses the recording or playback mode of the portable VTR.

When the portable VTR is set into the recording mode, this circuit sets the camera to supply the PAL output signal to the viewfinder, and the portable VTR for recording.

When the portable VTR is set into the playback mode, this circuit shuts off the camera function and supplies the playback signal from VTR to the viewfinder.

### Details

When the portable VTR is set into the recording mode, no DC bias is applied to the base of Q13 in IC210 and Q13 remains OFF, and 6.2V zener diode D11 connected between +9V (pin 9) and ground (pin 10) through R13 and R15 turns ON to switch Q201 ON. Therefore, +8.8V at the collector of Q201 is supplied to the Process circuit board. At the same time, the PAL output signal at pin 9 of IC203 is fed to the viewfinder and the portable VTR for recording through the Deflection circuit board.

When the portable VTR is set into the playback mode, the playback signal which rides on top of +6V DC is supplied from the VTR to the base of Q13. Q13 is turned on by the +6V and the potential of its emitter and D11 anode become approximately +5.3V. Therefore, the 6.2V zener diode D11 is turned OFF causing Q201 to be OFF and shut off the Process circuit board and Pre-amplifier circuit board. In this way, the PAL signal is not generated in the camera and only the playback signal from the portable VTR is supplied to the viewfinder through the Deflection circuit board.

In the playback mode, Q11 and Q12 are turned ON and pin 8 of IC203 is grounded for setting the output of PAL output at pin 9 to high potential for C219.

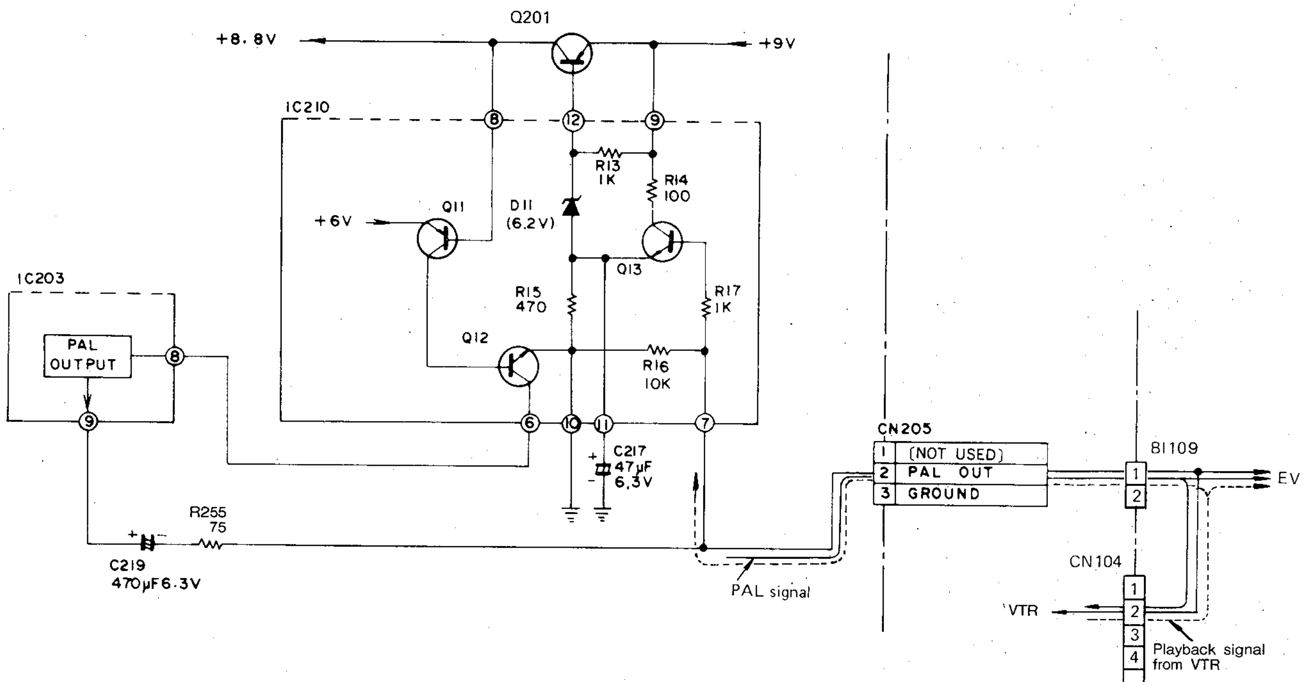

Q201
+8.8V
+9V
IC210
8
12
9
R13
1K
R14
100
+6V
Q11
D11
(6.2V)
Q13
IC203
R15
470
R17
1K
PAL
OUTPUT
Q12
R16
10K
6
10
11
7
CN205
1 (NOT USED)
2 PAL OUT
3 GROUND
81109
EVF
C217
47μF
6.3V
R255
75
C219
470μF6.3V
PAL signal
CN104
VTR
1
2
3
4
Playback signal
from VTR

Fig. 5-12 Playback Sense Circuit

ORDER NO. VKD81070560C8

# Service Manual

## Vol. 2

## *Adjustment Procedures*

## Colour Video Cameras

# WV-3030E/WV-3030N

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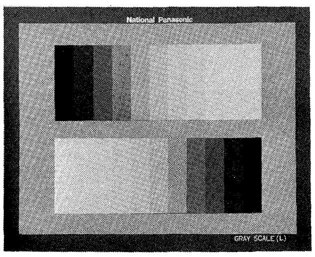
**Panasonic/National**

**Matsushita Electric Trading Co., Ltd.**
P.O. Box 288, Central Osaka Japan

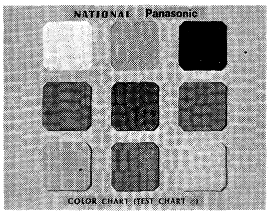
## 1. TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of WV-3030E/WV-3030N colour camera.

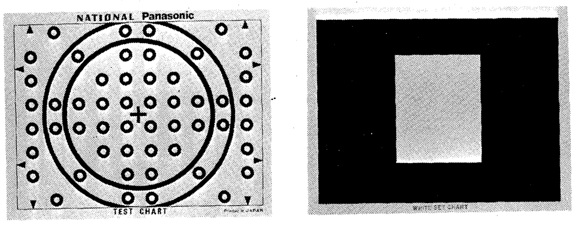
- Oscilloscope
  (dual trace, delayed, 25MHz bandwidth, with three proves, one must be 1:1)
- Digital voltmeter (DVM)
- Frequency counter
- Vectorscope
- Color video monitor
- Tripod
- Lighting [140 footcandles (1400 lux), 3200°K]
- Light meter
- Logarithmic gray scale chart (Parts No. YWV2310RB-99)


National Panasonic
GRAY SCALE (L)

- Color chart (Parts No. YWV2100RB98)

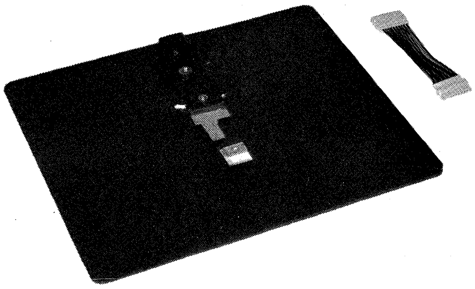

NATIONAL Panasonic
COLOR CHART (TEST CHART ©)

- Ball chart (Parts No. YWV2100RB03)


NATIONAL Panasonic
TEST CHART
WHITE SET CHART

Front Rear

- PCB holding jig (Parts No. YWFACX002)



## 2. DISASSEMBLING PROCEDURE FOR ADJUSTMENT

- Turn the power off.
- Remove the two screws on the handle grip, remove the handle grip and disconnect the coupling connector CN108 for VTR compatibility switch and CN109 for VTR start/stop switch, microphone and zoom switch. (Fig. 2-1)

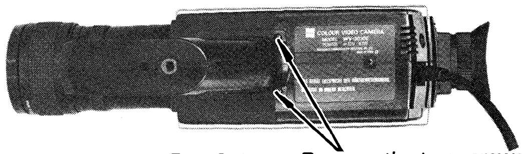
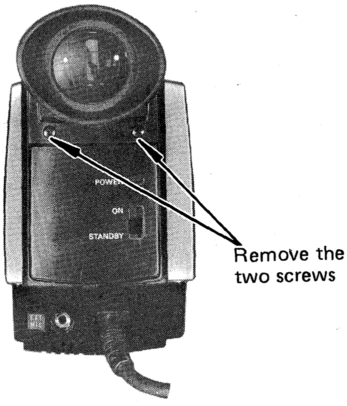


Fig. 2-1 **Remove the two screws**

- Remove the two screws on the rear side of the upper cover. (Fig. 2-2)


POWER
ON
STANDBY

**Remove the two screws**

Fig. 2-2

- After sliding back the upper cover slightly, lift up the rear portion of the cover and remove the upper cover from the camera unit. (Fig. 2-3)

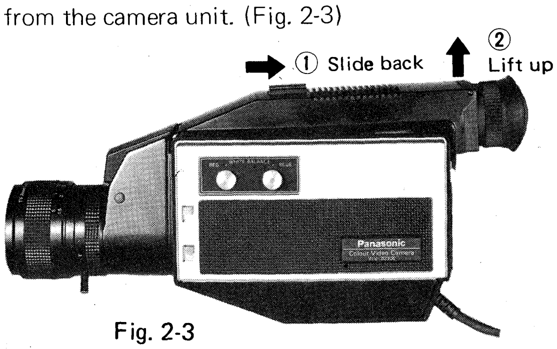

① Slide back
② Lift up
Panasonic
Colour Video Camera

Fig. 2-3

- Remove the two color adjustment (WHITE BALANCE) knobs on the right side cover (viewed from the front) by pulling them. (Fig. 2-4)

**Remove the knobs**

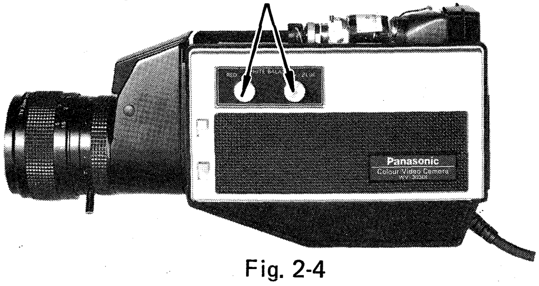

Panasonic
Colour Video Camera
WV-3030

Fig. 2-4

- Remove the two screws on the bottom and remove both side covers by pulling outward. (Fig. 2-5)

**Note:** 1. When reassembling the covers, the left side cover (viewed from the front) should be mounted first.

2. When installing the right side cover, set the indoor-outdoor selection switch and white balance switch to the upper position.

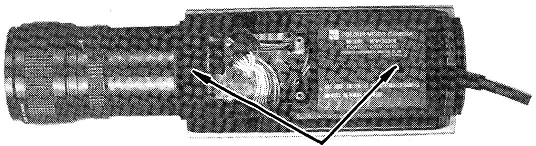

Remove the two screws

Fig. 2-5

**■ In case the PCB holding jig (Parts No. YWFACX002) is used:**

- Mount the camera unit onto the PCB holding jig with the three screws. (Figs. 2-6 & 2-7)

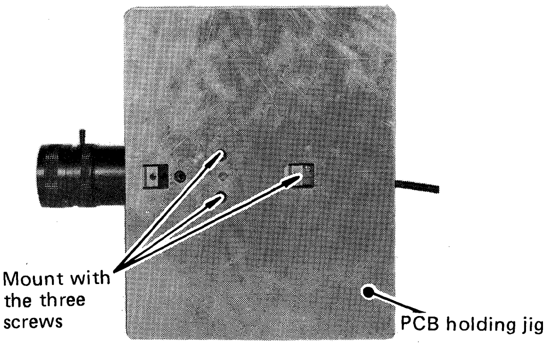

Mount with the three screws
PCB holding jig

Fig. 2-6

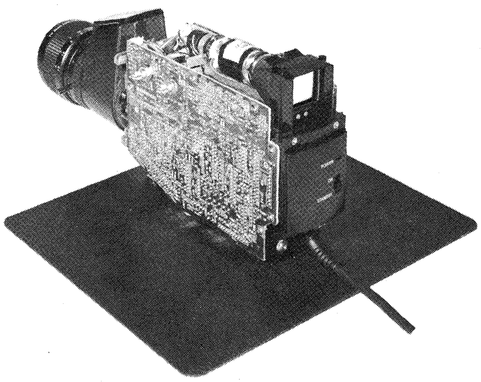


Fig. 2-7

- Remove the four screws on the Process circuit board in order to open the Process circuit board. (Fig. 2-8)

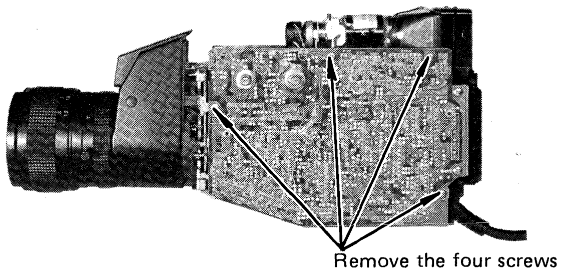

Remove the four screws

Fig. 2-8

- Remove the one screw on the coil chassis (Fig. 2-9) and one screw on the Deflection circuit borad (Fig. 2-10) in order to open the Deflection circuit board together with the viewfinder section and rear cover.

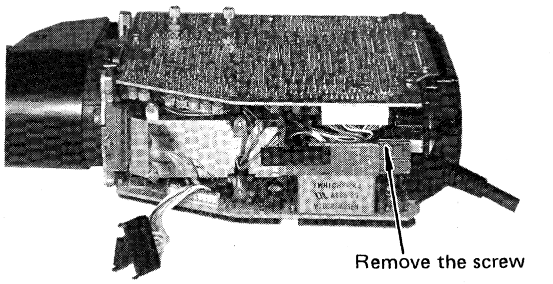

Remove the screw

Fig. 2-9

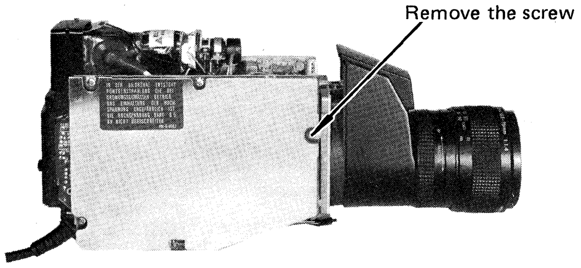

Remove the screw

Fig. 2-10

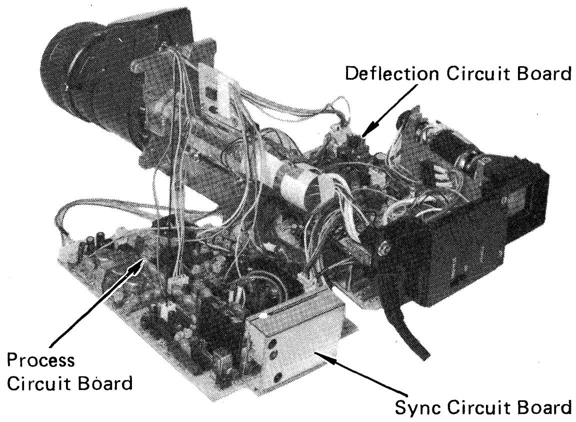

Deflection Circuit Board
Process Circuit Board
Sync Circuit Board

Fig. 2-11

Note: 1. When reassembling the circuit board, install the Deflection circuit board with the viewfinder and rear cover first.

## 3. VIDICON REPLACEMENT

- Disassemble the camera as described in Section 2. "DISASSEMBLING PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove the two screws on the coil guide, holding the vidicon socket shield case A and B, and remove the shield case A by unsoldering it from the shield plate for deflection coil. (Fig. 3-1)

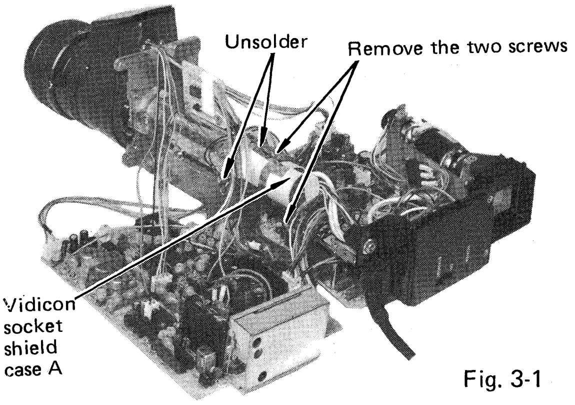

Unsolder
Remove the two screws
Vidicon socket shield case A

Fig. 3-1

- Disconnect the vidicon socket from the vidicon and remove the vidicon socket shield case B. (Fig. 3-2)

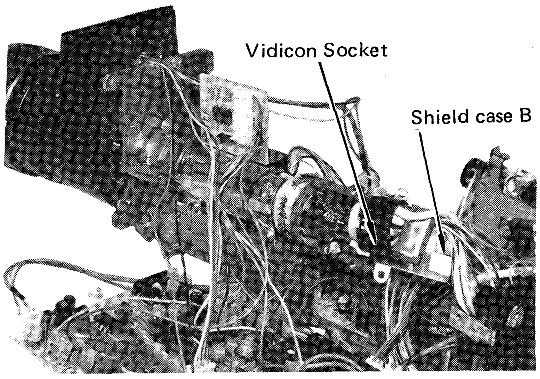

Vidicon Socket
Shield case B

Fig. 3-2

- Disconnect the connector CN103 for the automatic iris control (AIC) zoom lens from the Deflection circuit board. (Fig. 3-3)
- Disconnect the connectors CN202 and CN204 for the automatic iris control (AIC) zoom lens from the Process circuit board. (Fig. 3-3)

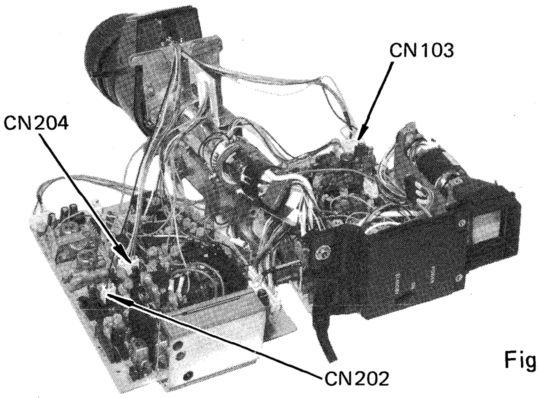

CN103
CN204
CN202

Fig. 3-3

- Remove the four screws which hold the lens unit onto the chassis, and remove the lens unit. (Fig. 3-4)

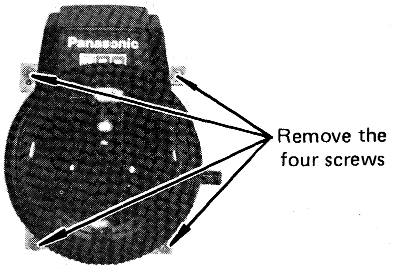

Panasonic
Remove the four screws

Fig. 3-4

- Remove the filter assembly by removing the two screws. (Fig. 3-5)

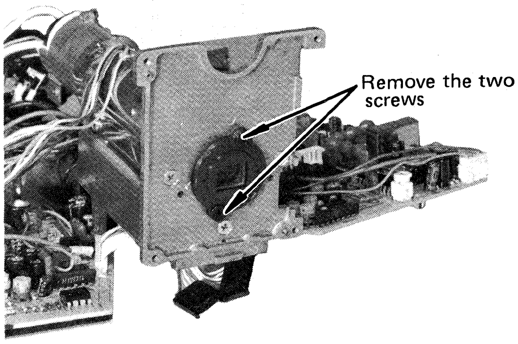

Remove the two screws

Fig. 3-5

- Loosen the vidicon holding screw (Fig. 3-6) and push the vidicon out (in the direction of the lens).

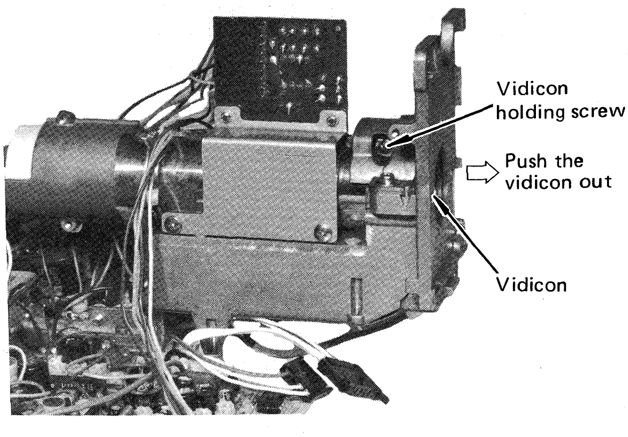

Vidicon holding screw
Push the vidicon out
Vidicon

Fig. 3-6

- Insert the new vidicon (parts No. S4094P) into the deflection coil and push it completely until it stops.

**Note:** 1. When inserting the vidicon in place, be careful not to expose the target directly to bright light.

2. Make sure that the vidicon is in the correct direction, i.e., the optical black on the vidicon is on the right and perpendicular to the horizontal line between the centers of the screws holding the lens mounting base as shown below. (Fig. 3-7)

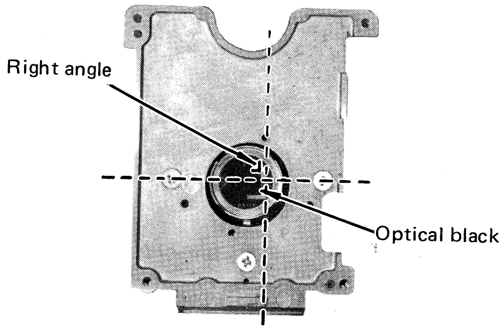

Right angle
Optical black

Fig. 3-7

- Tighten the vidicon holding screw (Fig. 3-6) to secure the vidicon in place.
- Clean the vidicon faceplate with the lens cleaning tissue or cloth.
- Install the filter assembly onto the chassis with the two screws. (Fig. 3-5)
- Mount the lens unit onto the chassis with the four screws (Fig. 3-4)
- Connect the connector CN103 for the automatic iris control (AIC) zoom lens to the Deflection circuit board. (Fig. 3-3)
- Connect the connectors CN202 and CN204 for the automatic iris control (AIC) zoom lens to the Process circuit board. (Fig. 3-3)
- Install the vidicon socket shield case B and connect the vidicon socket. (Fig. 3-2)

**Note:** The vidicon socket shield case A will be installed after the backfocus adjustment. (Fig. 3-8)

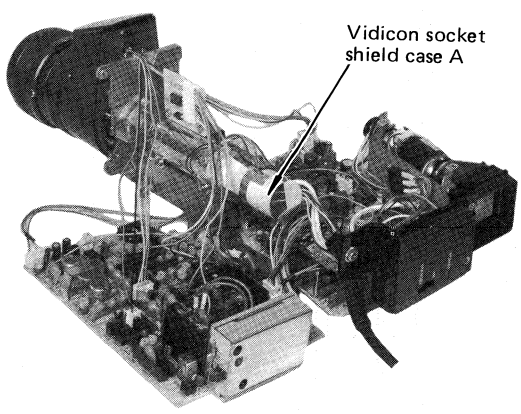

Vidicon socket
shield case A

Fig. 3-8

- **After replacing the vidicon, adjust the camera according to Section 5 "ADJUSTMENT PROCEDURE" on page 5.**

## 4. DISASSEMBLING PROCEDURE FOR HANDLE GRIP

- Remove the two screws on the handle grip, remove the handle grip and disconnect the coupling connector CN108 for VTR compatibility switch and CN109 for VTR start/stop switch, microphone and zoom switch. (Fig. 2-1)
- Remove the three screws on the handle grip. (Fig. 4-1)

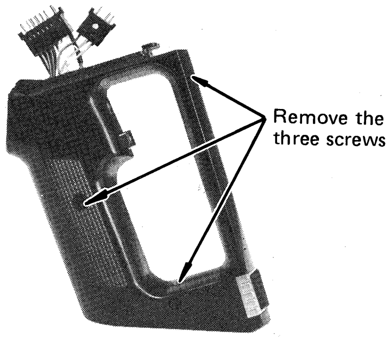

Remove the
three screws

Fig. 4-1

- After opening the handle grip covers from rear side, remove the handle grip left cover from the handle grip right cover. (Fig. 4-2 & Fig. 4-3)

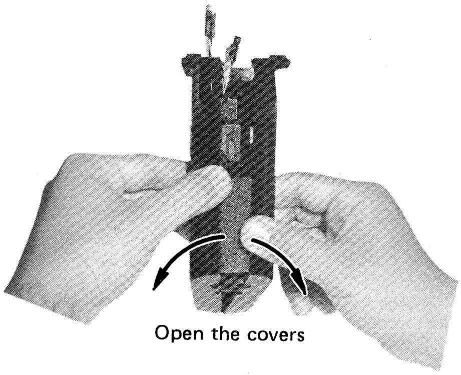

Open the covers

Fig. 4-2

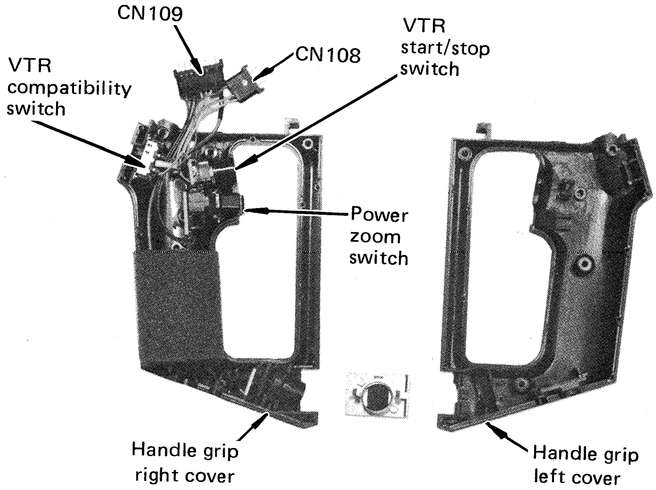

CN109
VTR
compatibility
switch
CN108
VTR
start/stop
switch
Power
zoom
switch
Handle grip
right cover
Handle grip
left cover

Fig. 4-3

# 5. ADJUSTMENT PROCEDURE

## 5-1. Connection and Setting Up for Adjustment

■ Connection

- Connect the camera cable from the camera to the power supply.
- Connect the video cable from the power supply to the color monitor.
- Terminate the color monitor video input in 75 ohms.

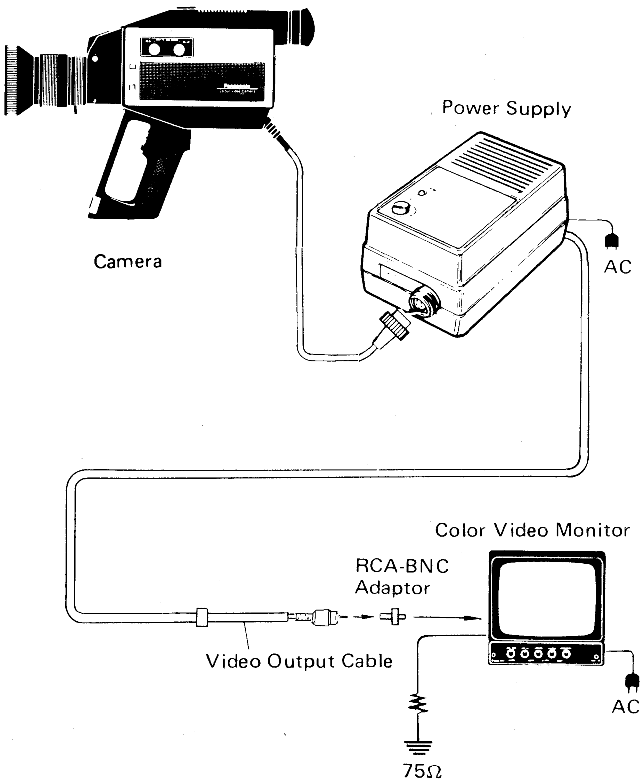


Fig. 5-1-1

■ Disassembling

- Disassemble the camera while referring to Section 2. "DISASSEMBLING PROCEDURE FOR ADJUSTMENT" on page 1.

■ Setting up

- Light: Incident light intensity on chart: 140 foot-candles (1400 lux)
  Color temperature: 3200°K
- Test Charts: Logarithmic gray scale chart (YWV2310RB99)
  Color chart (YWV2100RB98)
  Flat white chart
  Ball chart (YWV2100RB03)

**Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.**

■ Position of controls and switches on the camera

- Set the controls and switches on the camera as follows;

| | |
|---|---|
| Indoor-Outdoor Selection switch | Upper position* |
| White balance switch | Upper position (WHITE BALANCE) |
| Color adjustments control (RED and BLUE) | Center position |
| Standby power switch | Upper (ON) position |
| VHS/VTR compatibility switch | Upper position (+ RUN) |

**Note:** TP in this manual refers to a test point on the printed circuit board.

## 5-2. Power Supply Adjustment

**Note:** If a complete alignment is to be performed, proceed with the power supply adjustment first. If only a portion of the procedure is to be done, check the power supply voltage, but do not adjust unless it is in gross error (±0.1V).

- Refer to page 21 for the test point and adjusting control.

### (a) +9V adjustment

| | | |
|---|---|---|
| Test point: | TP104 (+9V) | Deflection Board |
| Adjust: | VR108 (+9V ADJ) | " " |

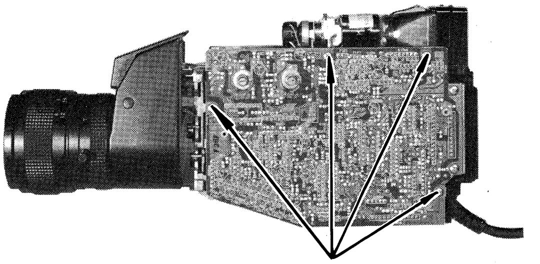
- Connect the DVM probe to TP104.
- Adjust +9V ADJ VR108 for 9V ±0.02V.

## 5-3. Sync Circuit Board Adjustment

- Refer to page 6 and page 21 for the test points and adjusting controls.

### (a) Disassembling for adjustment

- Turn the power OFF.
- Remove the four screws on the Process circuit board (Fig. 5-3-1) and remove the Deflection circuit board.



Remove the four screws

Fig. 5-3-1

### (b) 4.43MHz adjustment

| | | |
|---|---|---|
| Test point: | TP202 (SC) | Process Board |
| Adjust: | VC601 (4.43MHz ADJ) | Sync Board |

- Connect the frequency counter to TP202.
- Adjust 4.43MHz ADJ VC601 for 4.433618 MHz ±10Hz.

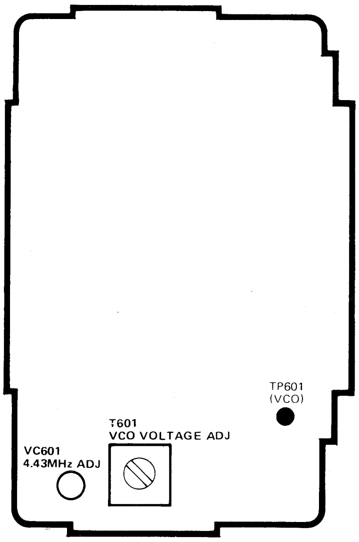
### (c) VCO voltage adjustment

| | | |
|---|---|---|
| Test point: | TP601 (VCO) | Sync Board |
| Adjust: | T601 (VCO VOLTAGE ADJ) | " |

- Connect the DVM probe to TP601.
- Adjust VCO VOLTAGE ADJ T601 for 4 ±0.5V.

## LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

Sync Circuit Board



## 5-4. Camera Unit Adjustment

**Note:** If a complete alignment including the viewfinder unit is to be performed, proceed the viewfinder adjustment first referring to 5-5. Viewfinder Adjustment on page 22.

- Refer to page 21 for the test points and adjusting controls.

### (a) Lens iris setting for adjustment

| | | |
|---|---|---|
| Adjust: | Iris setting screw | Zoom Lens Unit |

- Set the standby power switch on the rear of camera to the STANDBY position.

  **Note:** Before setting the lens iris opening, the standby power switch on the camera must be set to the STANDBY position or the power switch on the power supply must be turned OFF.
- Remove the cap for the iris setting screw from the zoom lens unit. (Fig. 5-4-1)

**Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.**

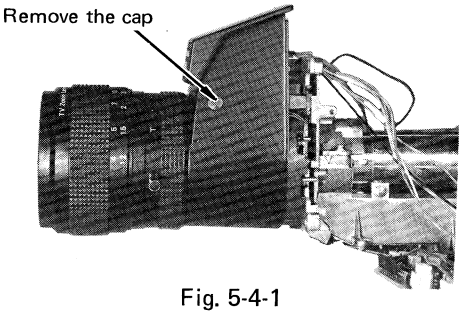


Fig. 5-4-1

- While pushing the iris setting screw (in the zoom lens unit) with the screw driver, turn the screw clockwise about 90 degrees by 90 degrees until it locks. When the iris setting screw is locked, the screw will not come back unless it is turned clockwise or counterclockwise.
- Set the standby power switch to the ON position. In this state, the automatic iris control function goes off and the lens iris is set to the specific iris opening.

### (b) Beam current adjustment

| | | |
|---|---|---|
| Test point: | TP201 (PRE VIDEO) | Process Board |
| Adjusts: | VR118 (BEAM) | Deflection Board |
| | VR215 (AIC SET) | Process Board |

- Set the zoom lens to the automatic iris control (AIC) mode by turning the iris setting screw in the zoom lens clockwise or counterclockwise to unlock it after setting the standby power switch to the STANDBY position.
- Set the standby power switch to the ON position.
- Turn AIC SET VR215 fully clockwise.
- Connect the oscilloscope to TP201.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- If a horizontal magenta bar is observed on the monitor, turn H.CENTERING VR111 clockwise until the bar disappears.
- Aim the camera at the scene which contains a high intensity object.
- Adjust BEAM VR118 until the waveform is clipped at 2.4Vp-p. (Fig. 5-4-2) If the signal does not increase up to 2.4Vp-p, aim the camera at a brighter object.

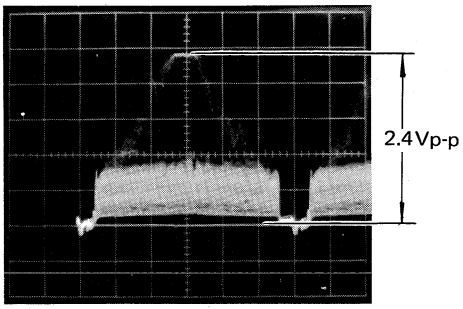


Fig. 5-4-2

(c) Beam alignment adjustment

| | | |
|---|---|---|
| Test points: | TP210 (B) | Process Board |
| | TP208 (R) | " " |
| | TP203 (+3.3V) | " " |
| Adjust: | VR120 (CAMERA FOCUS) | Deflection Board |
| | Alignment magnets | Coil Assembly |
| Observe: | Color monitor | |

- Set the lens iris referring to (a) Lens iris setting for adjustment on page 6.
- Disconnect the connector CN207 for the automatic gain control (AGC) from the Process circuit board and connect a jumper wire between pin 2 of CN207 and TP203 (+3.3V).
- Aim the camera at the white chart.
- Connect the oscilloscope to TP210(B) and TP208(R).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Turn DYNAMIC FOCUS VR103, VR104, VR105 and VR106 to their mechanical center.
- Also turn SIGNAL SHADING VR208 to VR211 and VR223 to VR226 to their mechanical center.
- Remove the two screws on the coil guide, holding the vidicon socket shield case A and B, and remove the shield case A by unsoldering it from the shield plate for deflection coil. (Fig. 5-4-3)

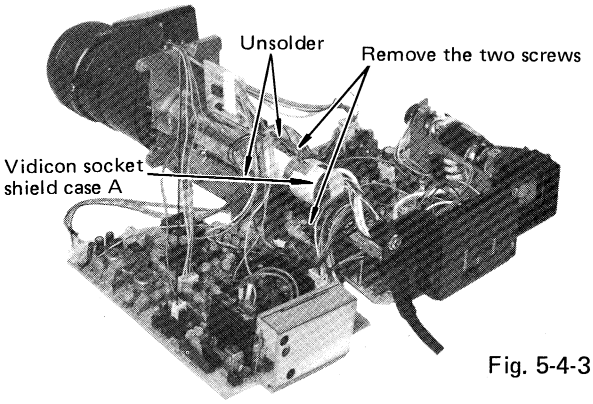
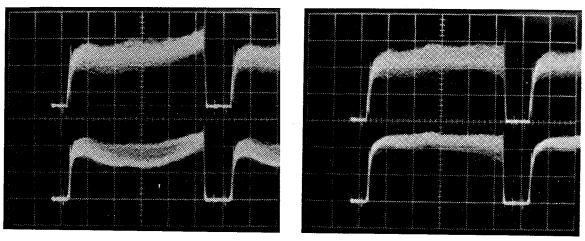


Fig. 5-4-3

- While observing the color monitor, adjust CAMERA FOCUS VR120 for minimum green tint in the center. At this time, the center portion of B and R signal waveforms at TP210 and TP208 become maximum. (Fig. 5-4-4)



NO GOOD GOOD

Fig. 5-4-4

- Then while watching the color monitor, rotate the alignment magnets (see Fig. 5-4-5) for minimum green tint in the center and maximum magenta (red) throughout the picture area.
  At this time, the waveform peaks of B and R signals are same in phase and maximum in amplitude. (Fig. 5-4-6)

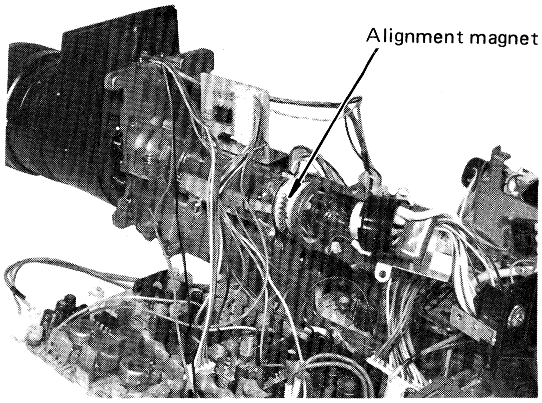
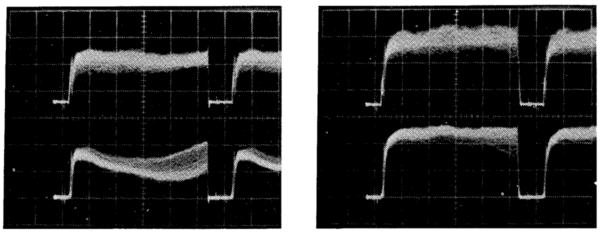


Fig. 5-4-5



NO GOOD GOOD

Fig. 5-4-6

- Overall focus is affected by the beam alignment adjustment so readjust CAMERA FOCUS VR120 occasionally while performing beam alignment adjustment.
- If a bright green area appears at the corner of the monitor, readjust the beam alignment with the alignment magnets.
- If green tinted areas still remain after repeating the beam alignment, they will be minimized by the dynamic focus and signal shading adjustments which follow.

(d) Focus coarse adjustment

| | | |
|---|---|---|
| Adjust: | VR120 (CAMERA FOCUS) | Deflection Board |
| Observe: | Color monitor | |

- Keep the lens iris set as in the preceding step.
- Keep connecting the jumper wire as in the preceding step.

- Aim the camera at the white chart.
- While observing the color monitor, adjust CAMERA FOCUS VR120 for minimum green tint and maximum magenta (red) throughout picture area.
- If bright green area appears at the corner of the monitor, readjust the beam alignment while referring to "(c) Beam alignment adjustment" on page 7.
- If green tinted areas still remain after repeating the beam alignment, they will be minimized by the dynamic focus and signal shading adjustment which follow.

### (e) Vidicon rotation

| | | |
|---|---|---|
| Test point: | Pin 3 of IC202 (Rc/Bc) | Process Board |
| Adjust: | Vidicon | |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Remove the two screws which hold the vidicon socket shield case A and B and remove the shield case A by unsoldering it from the shield plate for deflection coil. (Fig. 5-4-3)
- Loosen the vidicon holding screw. (Fig. 5-4-8)

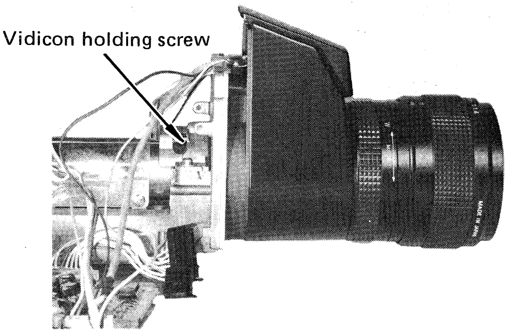


Fig. 5-4-8

- Aim the camera at the white chart.
- Connect the oscilloscope to pin 3 of IC202 on the process circuit board.
- Trigger the oscilloscope at V.rate. (Use TP213 on process board)
- Use the delayed sweep mode of oscilloscope to line-select 2H periods from the center of the waveform. (Fig. 5-4-9)

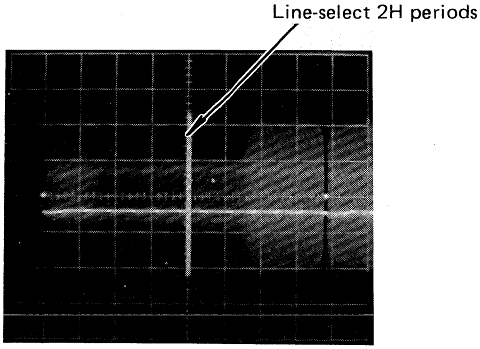


Fig. 5-4-9

- Rotate the vidicon by means of the vidicon socket (Fig. 5-4-10) (CAUTION, 1600V DC) and stop at the point where the waveform becomes as flat as possible. (Fig. 5-4-11)

  Ideally, the waveform should show one flat envelope of lesser amplitude and one of greater amplitude, each with a period of 1H.

  **Note:** Do not push the vidicon forward while rotating it.

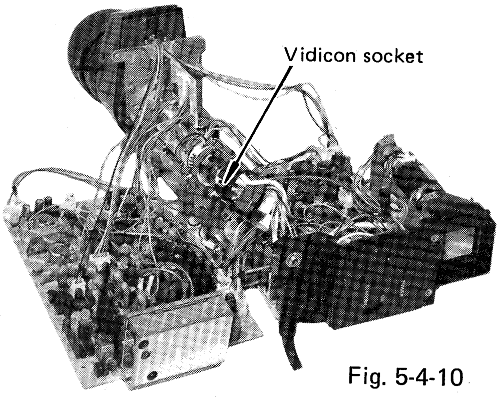


Fig. 5-4-10

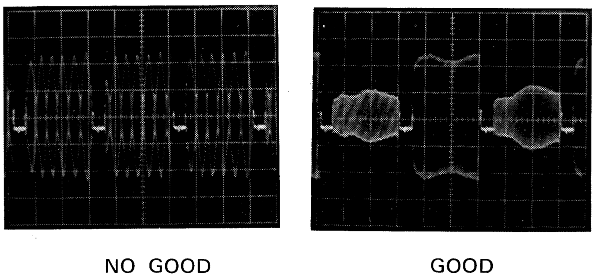


Fig. 5-4-11

- Carefully tighten the vidicon holding screw and make sure that the waveform remains properly adjusted.
- Install the vidicon socket shield case A with the two screws and resolder it after adjusting (f) Backfocus adjustment in the next step.

### (f) Backfocus adjustment

| | |
|---|---|
| Adjust: | Backfocus adjusting mechanism |
| Observe: | Color monitor |

- Set the zoom lens to the automatic iris control (AIC) mode by turning the iris setting screw in the zoom lens clockwise or counterclockwise to unlock it after setting the standby power switch to the STANDBY position.
- Remove the two screws which hold the vidicon socket shield case A and B, and remove the shield case A by unsoldering it from the shield plate for deflection coil. (Fig. 5-4-3)
- Set the standby power switch to the ON position.
- Lower the lighting level so that the lens iris opens fully in order to have minimum depth of focus.

- Aim the camera at an object further than 6 feet (2m) from the camera.
- Loosen the two backfocus fixing screws slightly. (Fig. 5-4-12)

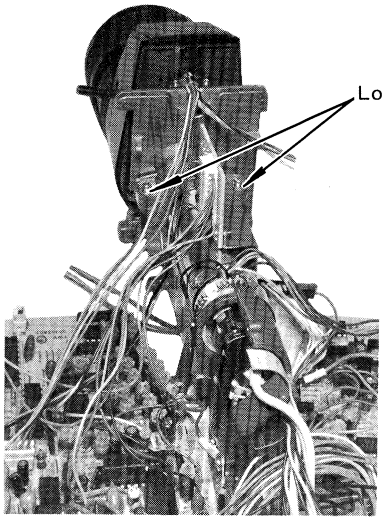


Fig. 5-4-12

- Zoom in (close up/telephoto) and adjust the lens focus.
- Zoom out (wide angle) and adjust the focus by moving the backfocus adjusting mechanism using a flat screw driver. (Fig. 5-4-13)

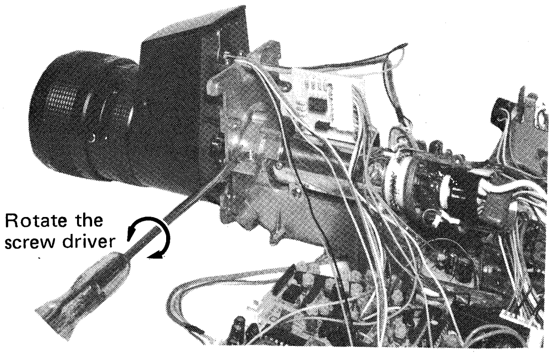


Fig. 5-4-13

- Zoom in again and adjust the focus by turning the lens focus.
- Zoom out again and adjust the focus by moving the backfocus adjusting mechanism with the driver.
- Repeat this procedure until the focus tracks throughout the zoom range.
- Install the vidicon socket shield case A and B with the two screws and resolder the shield case A to the shield plate for deflection coil. (Fig. 5-4-3)

(g) Horizontal size, horizontal linearity and vertical size adjustment

| | | |
|---|---|---|
| Test points: | TP204 (Y) | Process Board |
| | Pin 3 of IC202 (Rc/Bc) | 〃 〃 |
| Adjust: | VR109 (CAMERA H. SIZE) | Deflection Board |
| | VR110 (CAMERA H. LIN) | 〃 〃 |
| | VR112 (CAMERA V. SIZE) | 〃 〃 |

- Set the lens iris referring to (a) Lens iris setting for adjustment on page 6.
- Aim the camera at the white chart.
- Connect the oscilloscope to TP204.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Adjust CAMERA H.SIZE VR109 so that the carrier (3.58MHz) on the Y signal at TP204 is minimum. (Fig. 5-4-14)

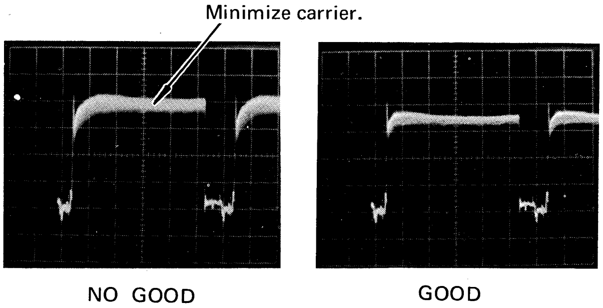


Fig. 5-4-14

- Adjust CAMERA H.LIN VR110 so that the carrier (3.58MHz) on the starting portion of Y signal at TP204 is minimum (Fig. 5-4-15) and the starting portion of Y signal becomes as flat as possible.
  At this time, the picture will have minimum disturbance (color shading) on the left side of the color monitor.

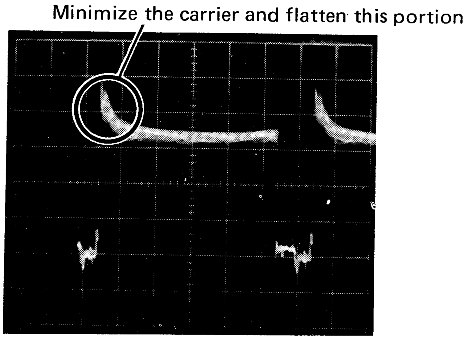


Fig. 5-4-15

- Repeat adjusting CAMERA H.SIZE VR109 and CAMERA H.LIN VR110 until the carrier on the Y signal is minimum, the starting portion of Y signal is flat and the picture has minimum disturbance on the left side.
- Connect the oscilloscope to pin 3 of IC202 on the Process circuit board.
- Trigger the oscilloscope at V.rate. (Use TP213 on process board)
- Adjust CAMERA V.SIZE VR112 for minimum beat during the vertical period. (Fig. 5-4-16)

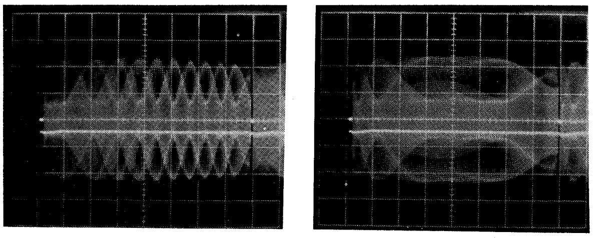


Fig. 5-4-16

**(h) Vertical centering adjustment**

| | | |
|---|---|---|
| Test point: | TP201 (PRE VIDEO) | Process Board |
| Adjust: | VR111 (H. CENTERING) | Deflection Board |
| | VR113 (V. CENTERING) | 〃 〃 |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.
- Connect the oscilloscope to TP201.
- Trigger the oscilloscope at V.rate. (Use TP213 on process board)
- Turn H. CENTERING VR111 fully counterclockwise. Note that the optical black clamp may disturb the picture.
- While observing the waveform, adjust V. CENTERING VR113 so that the marker which shows the vertical center of vidicon positions at the center of video signal waveform in vertical rate. (Fig. 5-4-17)

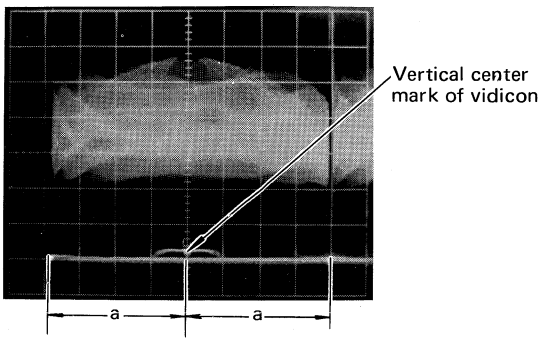


Fig. 5-4-17

- Turn H. CENTERING VR111 back until the magenta tint disappears.

**(i) Horizontal centering adjustment**

| | | |
|---|---|---|
| Test points: | TP105 (Hs) | Deflection Board |
| | TP201 (PRE VIDEO) | Process Board |
| Adjust: | VR111 (H. CENTERING) | Deflection Board |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.
- Connect the oscilloscope to TP201 and TP105.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Expand the horizontal blanking period on the oscilloscope.
- Adjust H. CENTERING VR111 until the optical black width is 3.5μsec. (Fig. 5-4-18)
  If the falling edge of the waveform corresponding to the picture area is noisy, adjust for the middle.

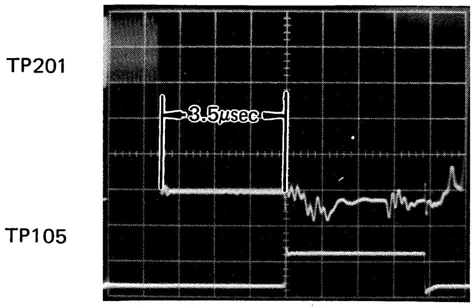


Fig. 5-4-18

**(j) Dark current and dark shading adjustment**

| | | |
|---|---|---|
| Test point: | TP201 (PRE VIDEO) | Process Board |
| Adjusts: | VR101 (H. PARABOLA) | Deflection Board |
| | VR102 (H. SAWTOOTH) | 〃 〃 |
| | VR114 (TARGET) | 〃 〃 |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Cap on the lens after aiming the camera at the white chart for a while (about 30 seconds) until the burning image on the vidicon disappears.
- Connect a 1:1 probe of the oscilloscope to TP201.
- Trigger the oscilloscope at V.rate. (Use TP213 on process board)

- Adjust TARGET VR114 so that the dark current is 50mV. (Fig. 5-4-19)

  **Note:** If there is dark shading, adjust the level at the center of the waveform.

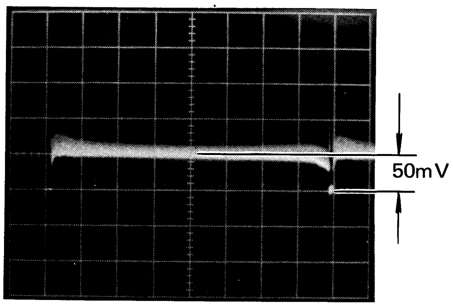


Fig. 5-4-19

- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- While watching the waveform, adjust DARK SHADING, H. PARABOLA VR101 and H. SAWTOOTH VR102 to make the dark current waveform as flat as possible. (Fig. 5-4-20)

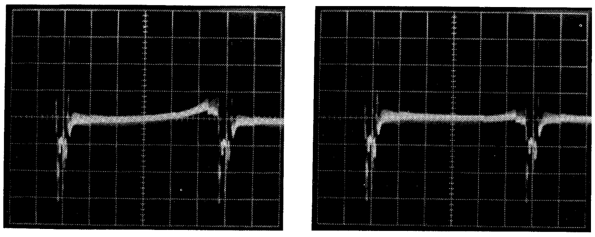

NO GOOD GOOD

Fig. 5-4- 20

- After the above adjustment, trigger the oscilloscope at V.rate again. (Use TP213 on process board)
- Confirm that the dark current in the middle of waveform is 50mV. If not, readjust TARGET VR114 for 50mV.

### (k) Beam current readjustment

- Adjust the beam current while referring to (b) Beam current adjustment on page 6.

### (l) Dynamic focus adjustment

| | | |
|---|---|---|
| Adjusts: | VR120 (CAMERA FOCUS) | Deflection Board |
| | VR103 (H. SAWTOOTH) | 〃 〃 |
| | VR104 (H. PARABOLA) | 〃 〃 |
| | VR105 (V. PARABOLA) | 〃 〃 |
| | VR106 (V. SAWTOOTH) | 〃 〃 |
| Observe: | Color monitor | |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.
- Observe the color monitor, and adjust CAMERA FOCUS VR120 for minimum green in the center and maximum magenta (red) throughout the picture area.
- Observe the color monitor and adjust for the best white balance at the center of the screen using the color adjustment (RED/BLUE) controls on the side of the camera.

- Increase the color monitor's chroma gain for better viewing.

  Make sure that the color monitor is converged properly.
- Adjust DYNAMIC FOCUS, H. SAWTOOTH VR103, H. PARABOLA VR104, V. PARABOLA VR105 and V. SAWTOOTH VR106 to minimize the green tint in the corners and edges of picture.

  **Note:**
  1. Overall focus is affected by the dynamic focus adjustment so readjust FOCUS VR120 occasionally while performing the dynamic focus adjustment.
  2. The object of this adjustment is to optimize overall focus, especially at the picture edges and corners.

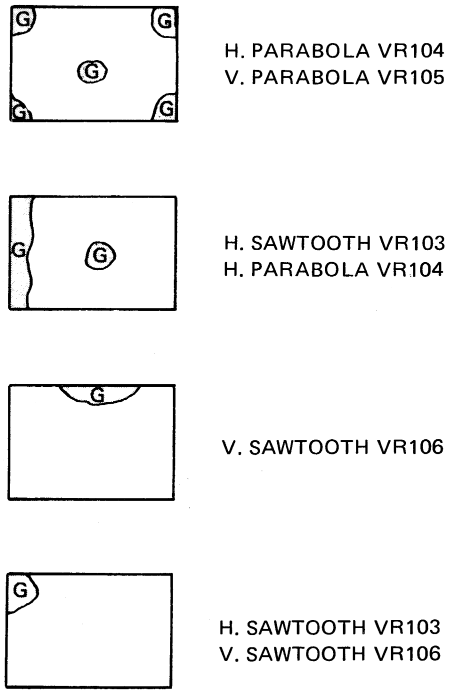


Fig. 5-4-21

### (m) Optical black (OB) correction and OB offset adjustment

| | | |
|---|---|---|
| Test point: | TP204 (Y) | Process Board |
| Adjusts: | VR217 (OB CORRECTION-SAW) | 〃 〃 |
| | VR218 (OB CORRECTION-PARA) | 〃 〃 |
| | VR219 (OB OFFSET) | 〃 〃 |

- Keep the lens iris set as in the preceding step.
- Disconnect the jumper wire between pin 2 of CN207 and TP203 on the process circuit board.
- Cap on the lens after aiming the camera at the white chart for a while (about 30 seconds) until burning image on the vidicon disappears.
- Connect the oscilloscope to TP204.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Adjust OB CORRECTION-SAW VR217 and OB CORRECTION-PARA VR218 so that the top portion of dark signal waveform becomes as narrow as possible. (Fig. 5-4-22)

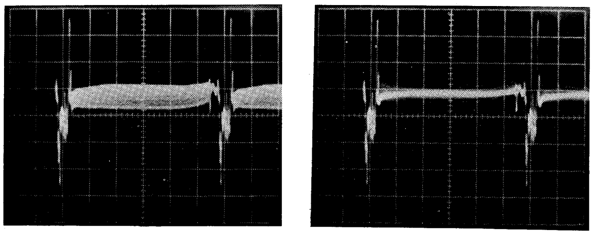
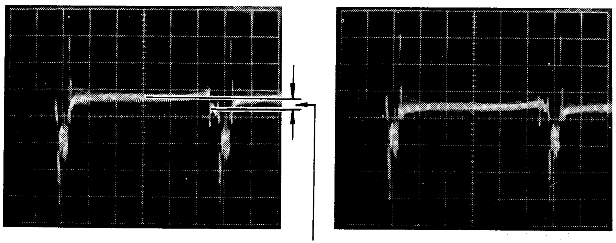

NO GOOD GOOD

Fig. 5-4-22

- Adjust OB OFFSET VR219 so that the center portion of dark current level matches the optical black (OB) level. (Fig. 5-4-23)


NO GOOD

Match the dark current and OB level.

GOOD

Fig. 5-4-23

### (n) Input level adjustment

| | | |
|---|---|---|
| Test point: | TP204 (Y) | Process Board |
| Adjusts: | VR201 (INPUT GAIN) | 〃 〃 |
| | VR215 (AIC SET) | 〃 〃 |

- Keep the lens iris set as in the preceding step.
- Connect the jumper wire between pin 2 of CN207 and TP203.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP204.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Adjust INPUT GAIN VR201 so that the voltage between the OB level and the fourth step (one step below the crossing step) of the gray scale waveform is 0.2V. (Fig. 5-4-24)

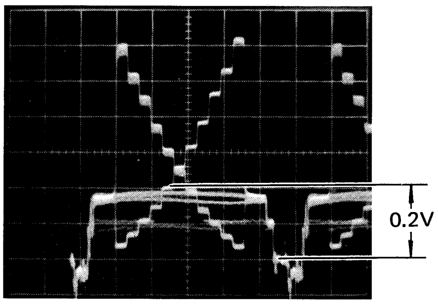


Fig. 5-4-24

- Set the zoom lens to the automatic iris control (AIC) mode by turning the iris setting screw in the zoom lens clockwise or counterclockwise to unlock it after setting the standby power switch to the STANDBY position.
- Set the standby power switch to the ON position.
- Adjust AIC SET VR215 so that the voltage between the OB level and the fourth step (one step below the crossing step) of the gray scale waveform is about 0.4V. (Fig. 5-4-25)

  **Note:** This is the presetting for B and R signal tracking-3 adjustment.

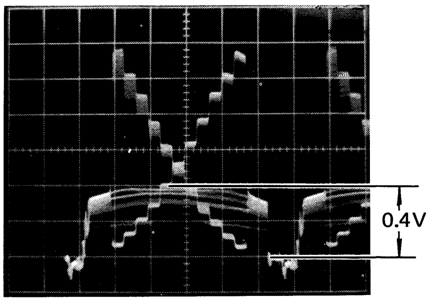
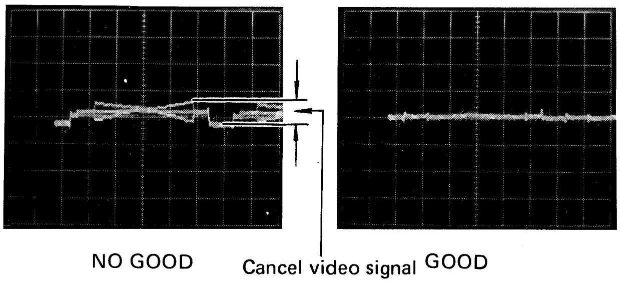


Fig. 5-4-25

### (o) Vertical edge balance adjustment

| | | |
|---|---|---|
| Test point: | TP216 (V. EDGE) | Process Board |
| Adjust: | VR230 (V. EDGE BALANCE) | 〃 〃 |

- Set the lens iris referring to (a) Lens iris setting for adjustment on page 6.
- Keep connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP216.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Adjust V. EDGE BALANCE VR230 to cancel the video signal. (Fig. 5-4-26)



NO GOOD GOOD

Fig. 5-4-26

### (p) Y gain adjustment

| | | |
|---|---|---|
| Test point: | Pin 2 of CN205 or PAL output | Process Board |
| Adjust: | VR205 (Y. GAIN) | 〃 〃 |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to pin 2 of CN205 or PAL output.
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Adjust Y. GAIN VR205 for 0.71V from the blanking level to the top step of the gray scale waveform. (Fig. 5-4-27)

  **Note:** If it is difficult to read the signal level due to the carrier signal, turn TRACKING-3 SET VR202 fully clockwise to minimize the carrier signal.

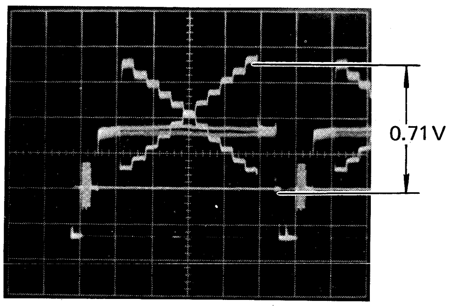


Fig. 5-4-27

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

- Cap on the lens after aiming the camera at the logarithmic gray scale chart for a while (about 30 seconds) until the burning image on the vidicon disappears.
- Connect a 1 : 1 probe of the oscilloscope to pin 2 of CN205 or PAL output.
- Trigger the oscilloscope at H. rate. (Use TP105 on deflection board, or TP214 on process board).
- Adjust Y. PED VR231 so that the dark current is 50mV. (Fig. 5-4-28)

  **Note:** After adjusting Y. GAIN VR205 and Y. PED VR231, turn VR202 fully counterclockwise.

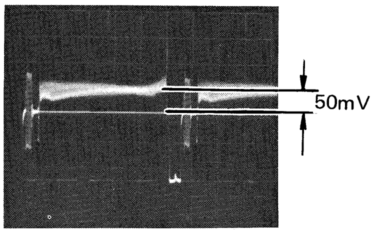
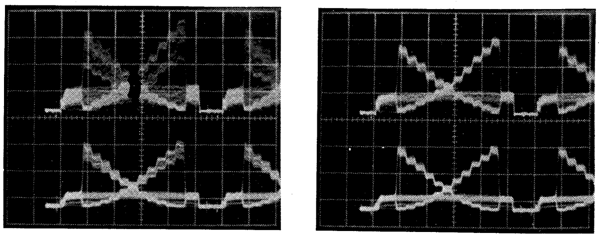


Fig. 5-4-28

### (q) R and B signal separation adjustment

| | | |
|---|---|---|
| Test points: | TP210 (B) | Process Board |
| | TP208 (R) | 〃 〃 |
| Adjusts: | VC201 (Rc/Bc SEPARATION-1) | 〃 〃 |
| | VR206 (Rc/Bc SEPARATION-2) | 〃 〃 |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP210(B) and TP208(R).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Adjust Rc/Bc SEPARATION-1 VC201 for minimum waveform flicker (especially B signal at TP210). (Fig. 5-4-29)
- Adjust Rc/Bc SEPARATION-2 VR206 for the same condition.
- Repeat adjusting VC201 and VR206 until the flicker in both waveform is minimum.



NO GOOD GOOD

Fig. 5-4-29

### (r) B gain and $Y_L$ pedestal preset adjustment

| | | |
|---|---|---|
| Test points: | TP210 (B) | Process Board |
| | TP209 ($Y_L$) | " " |
| Adjusts: | VR203 (Rc/Bc GAIN) | " " |
| | VR204 ($Y_L$ PED) | " " |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP210(B) and TP209($Y_L$).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board or TP214 on process board)
- **Set the color adjustment (RED/BLUE) controls on the side of the camera to the center position.**
- Turn B. TRACKING-1 VR228, B. TRACKING-2 VR227, R. TRACKING-1 VR213 and R. TRACKING-2 VR212 to their mechanical center.
- Turn B. TRACKING-3 VR229 and R. TRACKING-3 VR214 fully clockwise and TRACKING-3 SET VR202 fully counterclockwise.
- Overlay the B. signal and $Y_L$ signal on the oscilloscope, and adjust Rc/Bc GAIN VR203 so that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveform match. (Fig. 5-4-30)

  Note: Before adjusting VR203, if the gray scale's black chip of $Y_L$ signal is suppressed, turn $Y_L$ PED VR204 until the black chip of $Y_L$ signal can be observed.

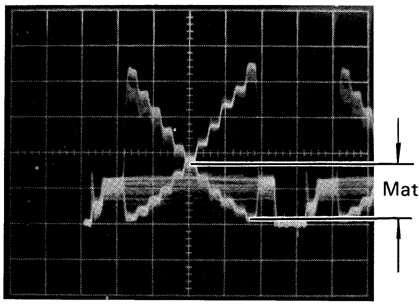


Fig. 5-4-30

- Next, adjust $Y_L$ PED VR204 so that the pedestal level of $Y_L$ signal matches that of B signal. (Fig. 5-4-31)

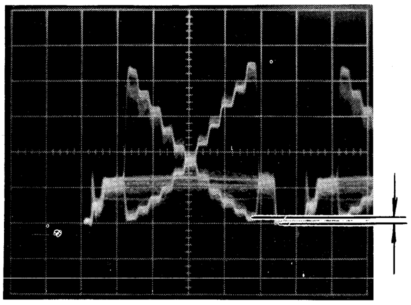


Fig. 5-4-31

- Repeat adjusting VR203 and VR204 until the signal level between the black chip (zero step) and fifth step (crossing step), and pedestal level of gray scale waveforms match.

### (s) R gain and R pedestal preset adjustment

| | | |
|---|---|---|
| Test points: | TP208 (R) | Process Board |
| | TP209 ($Y_L$) | " " |
| Adjusts: | VR220 (R. GAIN PRESET) | " " |
| | VR207 (R. PED) | " " |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP208(R) and TP209($Y_L$).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Overlay the R signal and $Y_L$ signal on the oscilloscope, and adjust R. GAIN PRESET VR220 so that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveform match. (Fig. 5-4-32)

  Note: Before adjusting VR220, if the gray scale's black chip of R signal is suppressed, turn R. PED VR207 until the black chip of R signal can be observed.

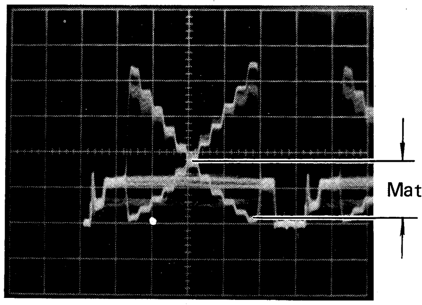


Fig. 5-4-32

- Next, adjust R. PED VR207 so that the pedestal level of R signal matches that of $Y_L$ signal. (Fig. 5-4-33)

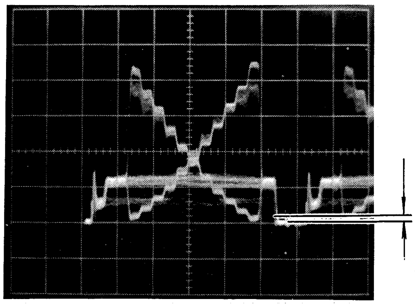


Fig. 5-4-33

- Repeat adjusting VR220 and VR207 until the signal level between the black chip (zero step) and fifth step (crossing step), and pedestal level of gray scale waveforms match.

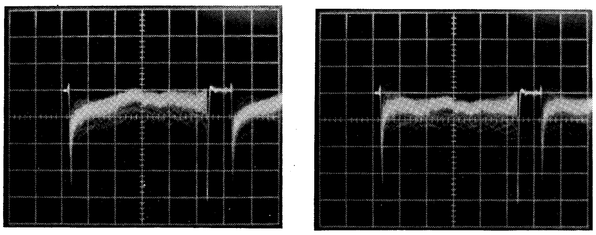
### (t) Signal shading adjustment

| | | |
|---|---|---|
| Test points: | TP210 (B) | Process Board |
| | TP208 (R) | 〃 〃 |
| | TP209 ($Y_L$) | 〃 〃 |
| Adjusts: | VR208 (R-V. PARABOLA) | 〃 〃 |
| | VR209 (R-V. SAWTOOTH) | 〃 〃 |
| | VR210 (R-H. PARABOLA) | 〃 〃 |
| | VR211 (R-H. SAWTOOTH) | 〃 〃 |
| | VR223 (B-V. PARABOLA) | 〃 〃 |
| | VR224 (B-V. SAWTOOTH) | 〃 〃 |
| | VR225 (B-H. PARABOLA) | 〃 〃 |
| | VR226 (B-H. SAWTOOTH) | 〃 〃 |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Aim the camera at the white chart.

**■ R signal shading adjustment**

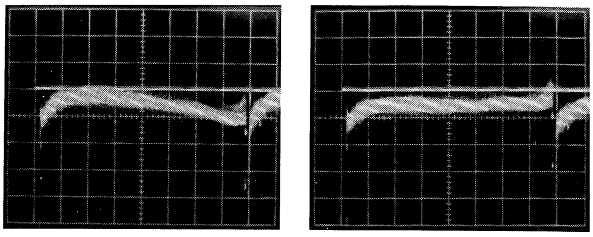
- Connect the oscilloscope to TP209($Y_L$) (ch1) and TP208(R) (ch2).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Invert ch2 (R, TP208) on the oscilloscope.
- Set the oscilloscope to ADD mode and observe the $Y_L$-R signal thus produced.
- Adjust R-H. PARABOLA VR210 and R-H SAWTOOTH VR211 to make the waveform as flat as possible. (Fig. 5-4-34)



NO GOOD GOOD

Fig. 5-4-34

- Trigger the oscilloscope at V.rate. (Use TP213 on process board)
- Adjust R-V. PARABOLA VR208 and R-V. SAWTOOTH VR209 to make the waveform as flat as possible. (Fig. 5-4-35)



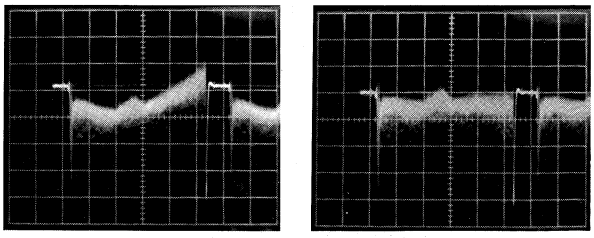
NO GOOD GOOD

Fig. 5-4-35

- Reset the Invert/Normal ch2 switch on the oscilloscope to Normal, and set to the Alternate mode.

**■ B signal shading adjustment**

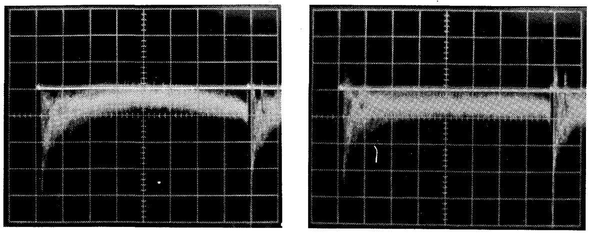
- Connect the oscilloscope to TP209($Y_L$) (ch1) and TP210(B) (ch2).
- Trigger the oscilloscope at H.rate. (Use TP105 on deflection board, or TP214 on process board)
- Invert ch2 (B, TP210) on the oscilloscope.
- Set the oscilloscope to ADD mode and observe the $Y_L$-B signal thus produced.
- Adjust B-H. PARABOLA VR225 and B-H. SAWTOOTH VR226 to make the waveform as flat as possible. (Fig. 5-4-36)



NO GOOD GOOD

Fig. 5-4-36

- Trigger the oscilloscope at V.rate. (Use TP213 on process board)
- Adjust B-V. PARABOLA VR223 and B-V. SAWTOOTH VR224 to make the waveform as flat as possible. (Fig. 5-4-37)



NO GOOD GOOD

Fig. 5-4-37

- Reset the Invert/Normal ch2 switch on the oscilloscope to Normal, and set the oscilloscope to the Alternate mode.

### (u) $Y_L$ and B signal tracking adjustment

| | | |
|---|---|---|
| Test points: | TP210 (B) | Process Board |
| | TP209 ($Y_L$) | " " |
| Adjusts: | VR203 (Rc/Bc GAIN) | " " |
| | VR204 ($Y_L$ PED) | " " |
| | VR227 (B. TRACKING-2) | " " |
| | VR228 (B. TRACKING-1) | " " |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Confirm that B.TRACKING-3 VR229 and R.TRACKING-3 VR214 are turned fully clockwise and TRACKING-3 SET VR202 is turned fully counterclockwise, and B. TRACKING-2 VR227 and B. TRACKING-1 VR228 are set to their mechanical center.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP210(B) and TP209($Y_L$).
- Trigger the oscilloscope at H. rate. (Use TP105 on deflection board, or TP214 on process board)
- Overlay the B signal and the $Y_L$ signal on the oscilloscope, and confirm that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveforms match. If not, adjust Rc/Bc GAIN VR203 to match them. (Fig. 5-4-38)

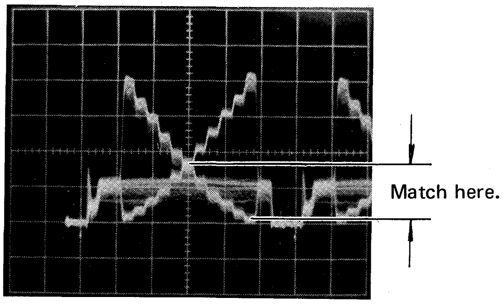


Fig. 5-4-38

- Adjust B. TRACKING-1 VR228 so that the B signal matches the $Y_L$ signal in the lower half of the gray scale waveform. (Fig. 5-4-39)

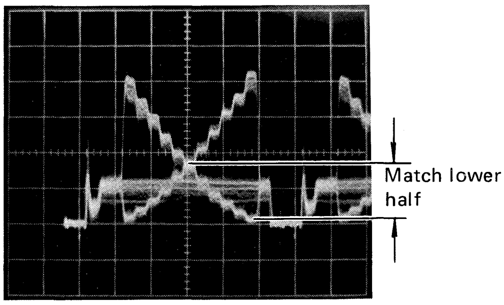


Fig. 5-4-39

- Adjust $Y_L$ PED VR204 so that the pedestal level of $Y_L$ signal matches that of B signal. (Fig. 5-4-40)

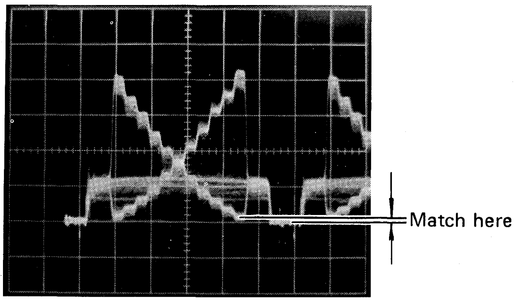


Fig. 5-4-40

- Adjust B. TRACKING-2 VR227 so that the B signal matches the $Y_L$ signal in the 8th ~ 9th step of gray scale waveform. (Fig. 5-4-41)

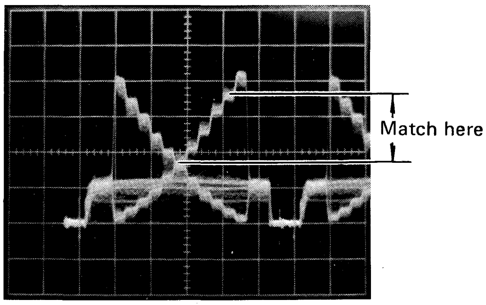


Fig. 5-4-41

- Repeat the above steps until the $Y_L$ and B signal waveforms match.

### (v) $Y_L$ and R signal tracking adjustment

| | | |
|---|---|---|
| Test points: | TP208 (R) | Process Board |
| | TP209 ($Y_L$) | " " |
| Adjusts: | VR220 (R. GAIN PRESET) | " " |
| | VR207 (R. PED) | " " |
| | VR212 (R. TRACKING-2) | " " |
| | VR213 (R. TRACKING-1) | " " |

- Keep setting the lens iris and connecting the jumper wire as in the preceding step.
- Confirm that R. TRACKING-1 VR213 and R. TRACKING-2 VR212 are set to their mechanical center.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP208(R) and TP209($Y_L$).
- Trigger the oscilloscope at H. rate. (Use TP105 on deflection board, or TP214 on process board)
- Overlay the R signal and the $Y_L$ signal on the oscilloscope and confirm that the signal level between the black chip (zero step) and fifth step (crossing step) of the gray scale waveforms match. If not, adjust R. GAIN PRESET VR220 to match them. (Fig. 5-4-42)

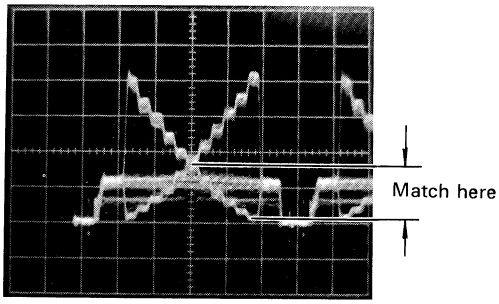


Fig. 5-4-42

- Adjust R. TRACKING-1 VR213 so that the R signal matches the $Y_L$ signal in the lower half of the gray scale waveform. (Fig. 5-4-43)

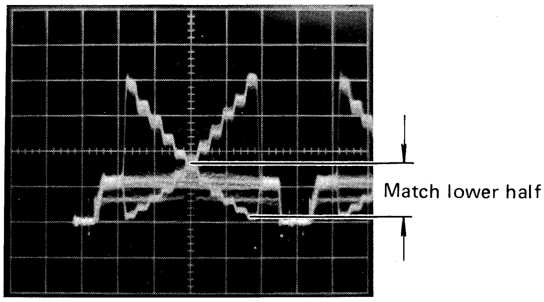


Fig. 5-4-43

- Adjust R. PED VR207 so that the pedestal level of $Y_L$ signal matches that of B signal. (Fig. 5-4-44)

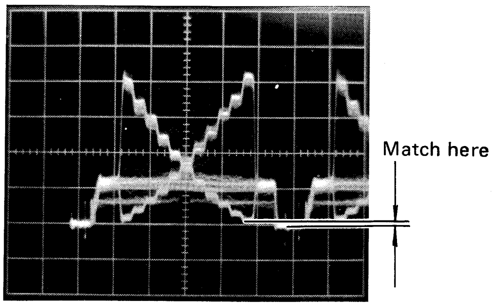


Fig. 5-4-44

- Adjust R. TRACKING-2 VR212 so that the R signal matches the $Y_L$ signal in the 8th ~ 9th step of gray scale waveform. (Fig. 5-4-45)

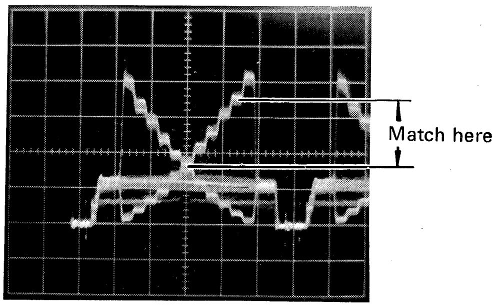


Fig. 5-4-45

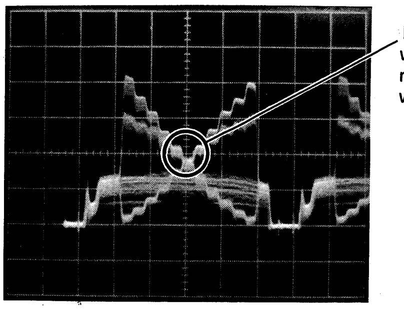
- Repeat the above steps until the $Y_L$ and R signal waveforms match.

### (w) B and R signal tracking-3 adjustment

| | | |
|---|---|---|
| Test points: | TP210 (B) | Process Board |
| | TP208 (R) | " " |
| | TP209 ($Y_L$) | " " |
| Adjusts: | VR229 (B. TRACKING-3) | " " |
| | VR214 (R. TRACKING-3) | " " |
| | VR202 (TRACKING-3 SET) | " " |

- Set the zoom lens to the automatic iris control (AIC) mode by turning the iris setting screw in the zoom lens clockwise or counterclockwise to unlock it after setting the standby power switch on the rear of camera to the STANDBY position.
- Set the standby power switch to the ON position.
- Confirm That B. TRACKING-3 VR229 and R. TRACKING-3 VR214 are turned fully clockwise and TRACKING-3 SET VR202 is turned fully counter-clockwise.

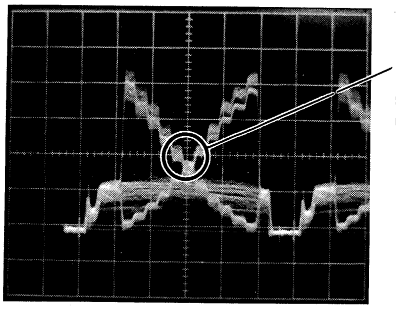
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP210(B) and TP209($Y_L$).
- Trigger the oscilloscope at H. rate. (Use TP105 on deflection board, or TP214 on process board)
- Compare the B signal and $Y_L$ signal on the oscilloscope, and note the step at which the B signal no longer tracks with the $Y_L$ signal. (Fig. 5-4-45)
  In the example shown in Fig. 5-4-46, 6th step is the point of divergence.



Note the step at which the B signal no longer tracks with the $Y_L$ signal.

Fig. 5-4-46.

- Turn back TRACKING-3 SET VR202 slowly and stop it at the point where the noted step of B signal just starts to be extended. (Fig. 5-4-47)



Adjust VR202 so that the noted step of B signal just starts to be extended.

Fig. 5-4-47

- Adjust B. TRACKING-3 VR229 so that the B signal matches the $Y_L$ signal in the 8th ~ 9th step of gray scale waveform. (Fig. 5-4-48)

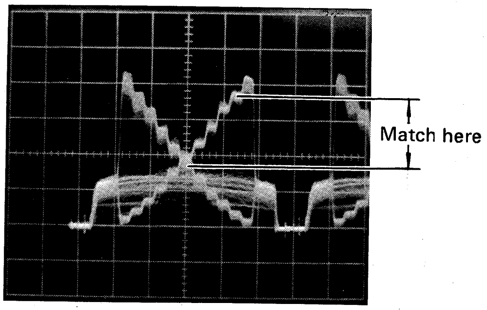


Fig. 5-4-48

- Repeat the above steps until the B signal and $Y_L$ signal match.

- Connect the oscilloscope to TP208(R) and TP209($Y_L$).
- Overlay the R signal and the $Y_L$ signal on the oscilloscope, and adjust R. TRACKING-3 VR214 so that the R signal matches the $Y_L$ signal in the 8th ~ 9th step of gray scale waveform. (Fig. 5-4-49)

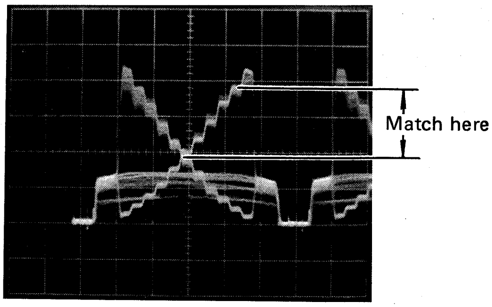


Fig. 5-4-49

(x) AIC Level adjustment

| | | |
|---|---|---|
| Test point: | Pin 2 of CN205 or PAL output | Process Board |
| Adjust: | VR215 (AIC SET) | " " |

- Keep setting the lens iris to the automatic iris control (AIC) mode as in the preceding step.
- Disconnect the jumper wire between pin 2 of CN207 and TP203, and connect CN207.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to pin 2 of CN205 or PAL output.
- Trigger the oscilloscope at H. rate. (Use TP105 on deflection board, or TP214 on process board)
- Adjust AIC SET VR215 for 0.71V from the blanking level to the top step of the gray scale waveform. (Fig. 5-4-50)

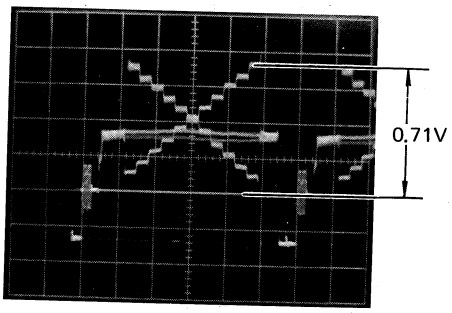


Fig. 5-4-50

(y) Chroma gain and burst phase adjustment

| | | |
|---|---|---|
| Test point: | Pin 2 of CN205 or PAL output | Process Board |
| Adjusts: | VR216 (CHROMA GAIN) | " " |
| | VC202 (BURST PHASE) | " " |
| Observe: | Vectorscope | |

■ **Adjustment using vectorscope**

- Keep setting the lens iris and connecting CN207 as in the preceding step.
- Aim the camera at the color chart (YWV2100RB98) so that the chart occupies the raster of color monitor.
- Connect the PAL output to a terminated vectorscope.
- Turn the PHASE control of the vectorscope so that the burst vectors (Nth and N + 1st line) position on the burst axes on the vectorscope.
- Adjust BURST PHASE VC202 so that the phase of RED vectors (Nth and N + 1st line) are same against the B-Y(U) axis on the vectorscope. (Fig. 5-4-51)
- Adjust CHROMA GAIN VR216 so that the RED vector is equal to 150% as compares to the burst vector. (Fig. 5-4-51)

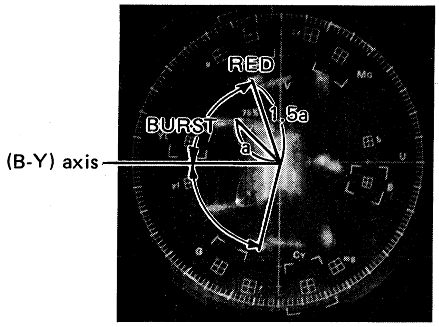


Fig. 5-4-51

■ **Adjustment without using vectorscope**

- Keep setting the lens iris and connecting CN207 as in the preceding step.
- Aim the camera at the color chart (YWV2100RB98) so that the chart occupies the raster of color monitor.
- Turn BURST PHASE VC202 slowly and stop it when the color is maximum on the color monitor.
- Connect the oscilloscope to pin 2 of CN205 or PAL output.
- Trigger the oscilloscope at H. rate. (Use TP105 on deflection board, or TP214 on process board)
- Cover the cyan chip (Fig. 5-4-52) of color chart with a black paper for easy observation of red chrominance signal.

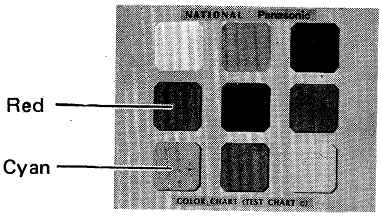


Fig. 5-4-52

- Adjust CHROMA GAIN VR216 so that the red chrominance level is equal to 150% as compares to the burst signal level. (Fig. 5-4-53)

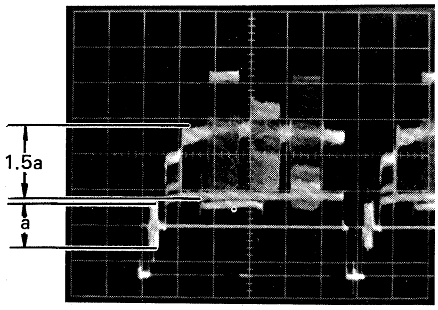
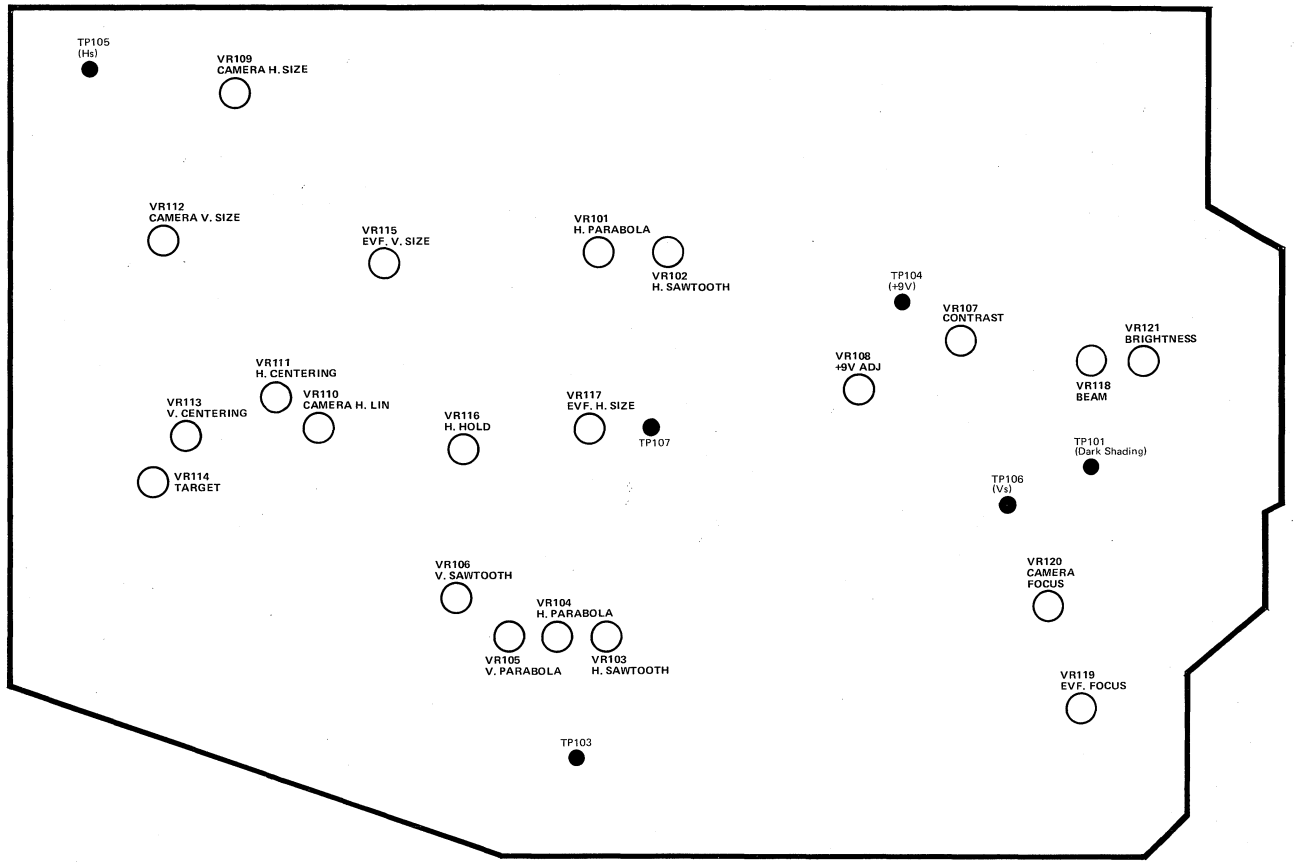


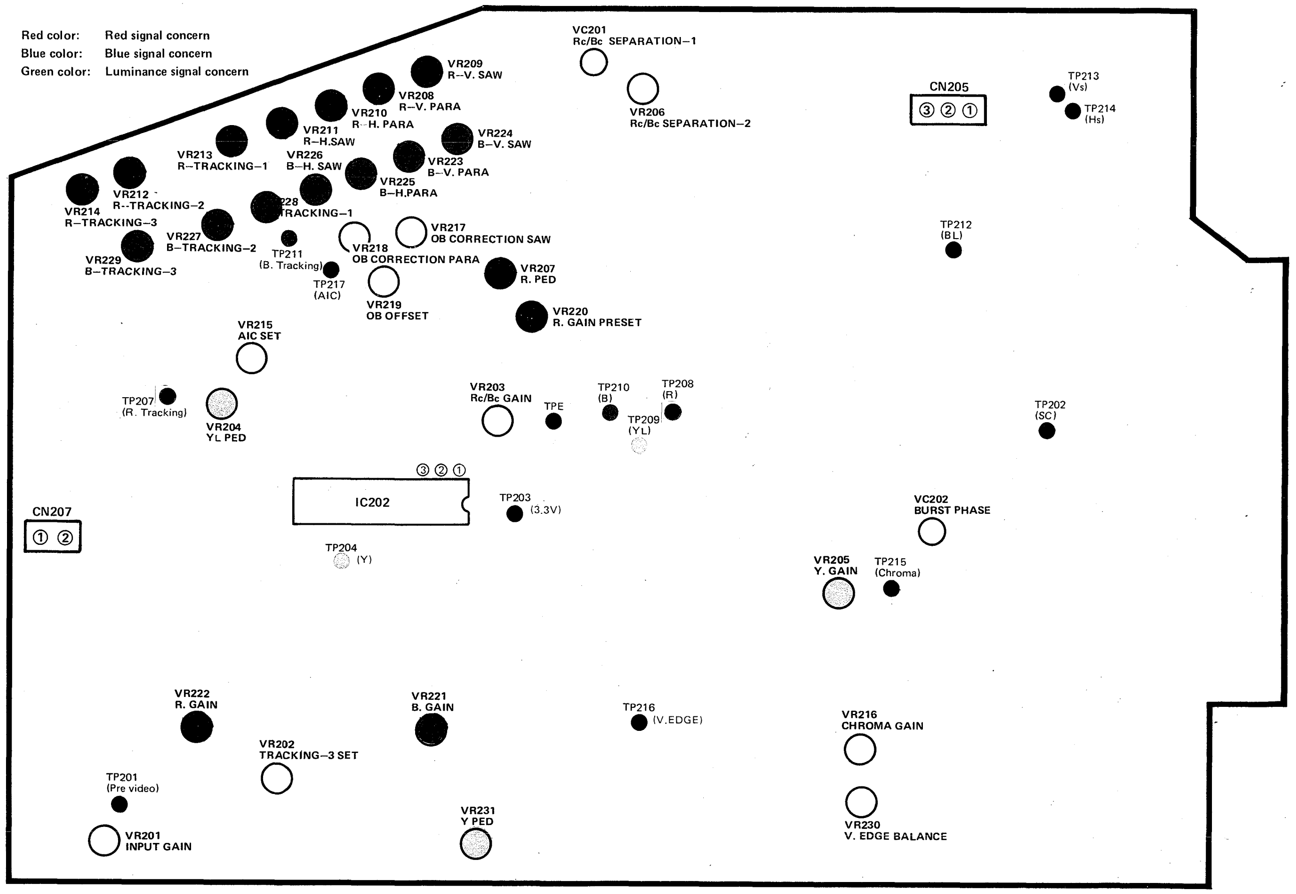
Fig. 5-4-53

# LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

## DEFLECTION CIRCUIT BOARD


TP105 (Hs)
VR109 CAMERA H. SIZE
VR112 CAMERA V. SIZE
VR115 EVF. V. SIZE
VR101 H. PARABOLA
VR102 H. SAWTOOTH
TP104 (+9V)
VR107 CONTRAST
VR121 BRIGHTNESS
VR108 +9V ADJ
VR118 BEAM
VR111 H. CENTERING
VR110 CAMERA H. LIN
VR113 V. CENTERING
VR116 H. HOLD
VR117 EVF. H. SIZE
TP107
TP101 (Dark Shading)
VR114 TARGET
TP106 (Vs)
VR106 V. SAWTOOTH
VR104 H. PARABOLA
VR120 CAMERA FOCUS
VR105 V. PARABOLA
VR103 H. SAWTOOTH
VR119 EVF. FOCUS
TP103

## PROCESS CIRCUIT BOARD


Red color: Red signal concern
Blue color: Blue signal concern
Green color: Luminance signal concern
VC201 Rc/Bc SEPARATION–1
VR209 R–V. SAW
VR208 R–V. PARA
VR206 Rc/Bc SEPARATION–2
CN205 ③ ② ①
TP213 (Vs)
TP214 (Hs)
VR210 R–H. PARA
VR211 R–H.SAW
VR224 B–V. SAW
VR213 R–TRACKING–1
VR226 B–H. SAW
VR223 B–V. PARA
VR225 B–H.PARA
VR212 R–TRACKING–2
VR214 R–TRACKING–3
228 TRACKING–1
VR217 OB CORRECTION SAW
TP212 (BL)
VR227 B–TRACKING–2
TP211 (B. Tracking)
VR218 OB CORRECTION PARA
VR229 B–TRACKING–3
TP217 (AIC)
VR207 R. PED
VR219 OB OFFSET
VR220 R. GAIN PRESET
VR215 AIC SET
VR203 Rc/Bc GAIN
TPE
TP210 (B)
TP208 (R)
TP209 (YL)
TP207 (R. Tracking)
VR204 YL PED
TP202 (SC)
③ ② ①
IC202
TP203 (3.3V)
CN207 ① ②
VC202 BURST PHASE
TP204 (Y)
VR205 Y. GAIN
TP215 (Chroma)
VR222 R. GAIN
VR221 B. GAIN
TP216 (V.EDGE)
VR216 CHROMA GAIN
VR202 TRACKING–3 SET
TP201 (Pre video)
VR231 Y PED
VR230 V. EDGE BALANCE
VR201 INPUT GAIN

## 5-5. Viewfinder Adjustment

- If a complete alignment of camera including the viewfinder unit is to be performed, proceed the viewfinder adjustment first.
- The conditions and connections for viewfinder adjustment are the same as shown in Fig. 5-1-1 on page 5.
- Refer to page 21 at for the adjusting controls.

### (a) Horizontal hold adjustment

| | | |
|---|---|---|
| Adjust: | VR116 (H. HOLD) | Deflection Board |
| Observe: | Viewfinder | |

- Aim the camera at the ball chart (YWV2100RB03)
- Adjust H. HOLD VR116 to a mid-point of horizontal hold lock range.

### (b) Reduce picture size using EVF H. SIZE VR117 and EVF V. SIZE VR115.

### (c) Picture tilt adjustment

| | |
|---|---|
| Adjust: | Deflection coil |
| Observe: | Viewfinder |

- Make sure the camera is level with the chart.
- Loosen the deflection coil holding screw. (Fig. 5-5-1)

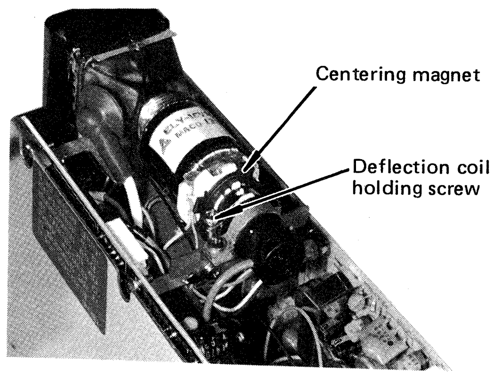


Fig. 5-5-1

- Observe the viewfinder, and turn the deflection coil until the image is straight.
- Tighten the deflection coil holding screw.

### (d) Centering magnets adjustment

| | |
|---|---|
| Adjust: | Centering Magnets |
| Observe: | Viewfinder |

- Aim the camera at the ball chart.
- Adjust the centering magnets (see Fig. 5-5-1) until the center of picture (raster) comes to the center of the viewfinder screen. (Fig. 5-5-2)

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

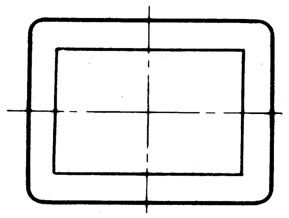


Fig. 5-5-2

### (e) Horizontal and vertical size adjustment

| | | |
|---|---|---|
| Adjusts: | VR117 (EVF H. SIZE) | Deflection Board |
| | VR115 (EVF V. SIZE) | " |
| Observe: | Viewfinder | |

- Aim the camera at the ball chart, and line up the reference arrow head with edge of the raster (blanking) on the viewfinder. (Fig. 5-5-3)
- Adjust EVF H. SIZE VR117 to a point where the ball chart's edges just disappear on the viewfinder. (Fig. 5-5-3)

  Confirm that the picture increase by same amount on both sides.
- Then adjust EVF V SIZE VR115 so that the circle in the chart is nearly a true circle.

  Confirm that the picture increases by same amount on top and bottom.

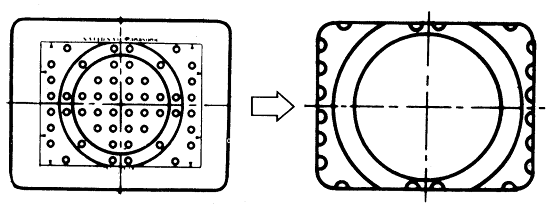


Fig. 5-5-3

### (f) Focus adjustment

| | | |
|---|---|---|
| Adjust: | VR119 (EVF FOCUS) | Deflection Board |
| Observe: | Viewfinder | |

- Aim the camera at the resolution chart.
- Adjust EVF FOCUS VR119 for best resolution in the viewfinder.

### (g) Contrast and brightness adjustment

| | | |
|---|---|---|
| Adjusts: | VR107 (CONTRAST) | Deflection Board |
| | VR121 (BRIGHTNESS) | " |
| Observe: | Viewfinder | |

- Aim the camera at the logarithmic gray scale chart.
- Adjust CONTRAST VR107 and BRIGHTNESS VR121 so that the black-and-white chip gradations will be the same on the viewfinder screen as that in the monitor.

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B–242

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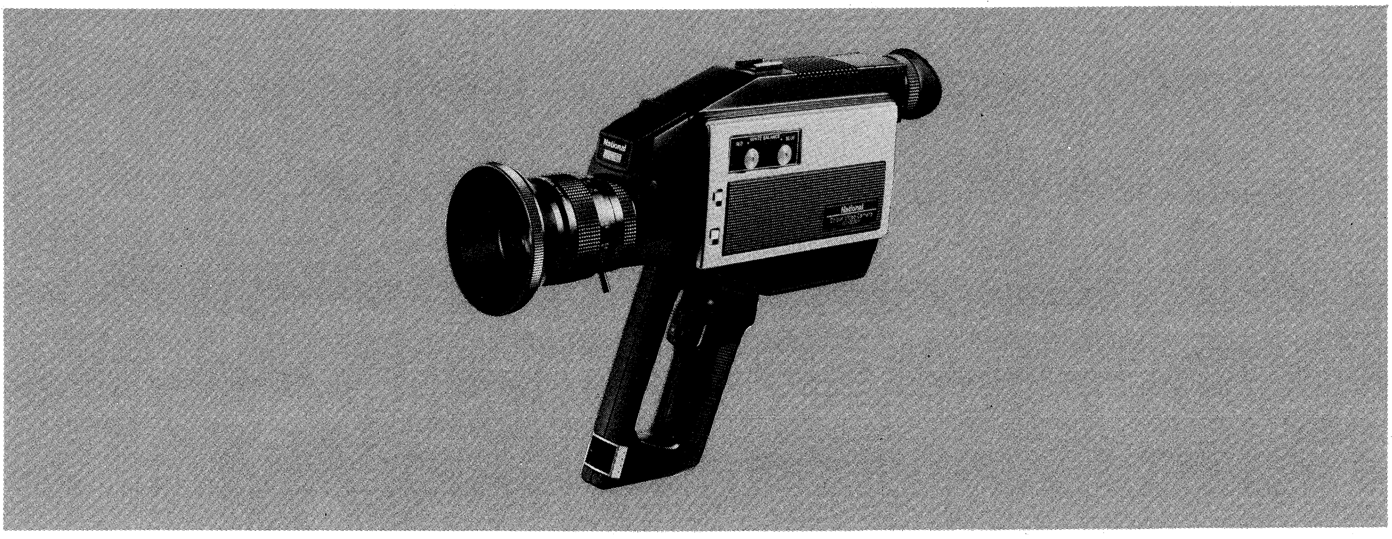
# Service Manual

**Vol. 3**

**Block Diagrams**
**Schematic Diagrams**
**Conductor Views**

## Colour Video Cameras
# WV-3030E/WV-3030N



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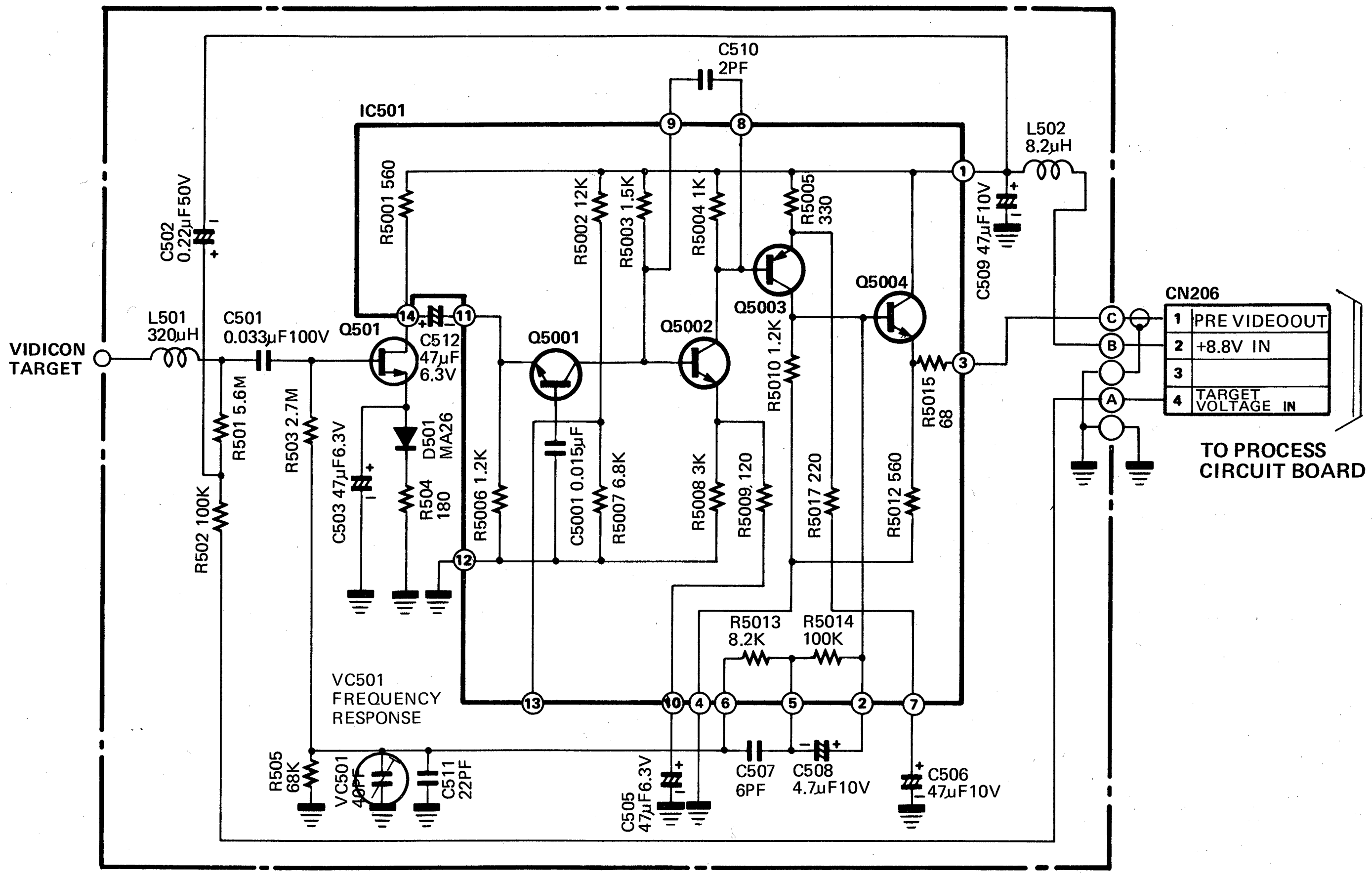
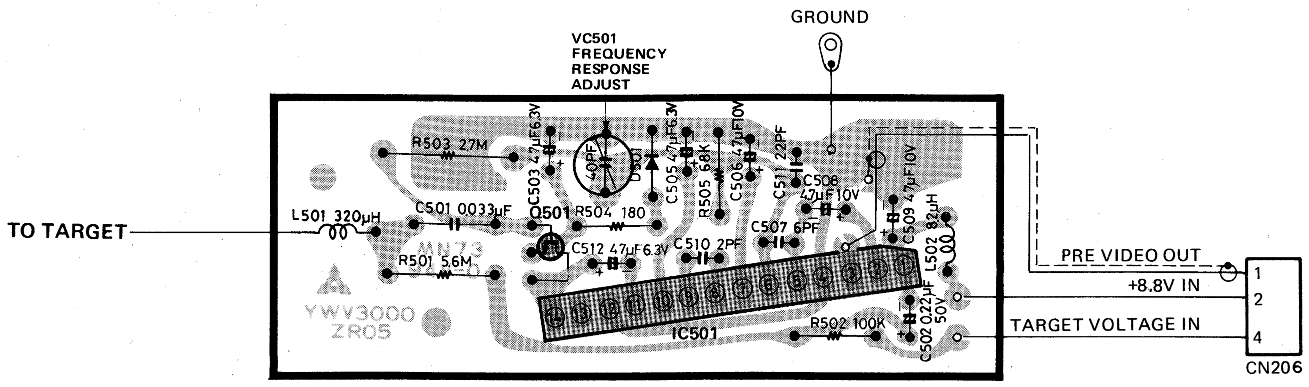
**Panasonic/National**

**Matsushita Electric Trading Co., Ltd.**
P.O. Box 288, Central Osaka Japan

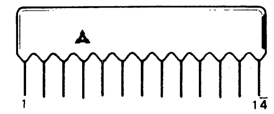
# SCHEMATIC DIAGRAM OF PREAMPLIFIER CIRCUIT BOARD (YWV3030ZK05)


IC501
C510
2PF
L502
8.2μH
C502
0.22μF50V
R5001 560
R5002 12K
R5003 1.5K
R5004 1K
R5005
330
C509 47μF10V
VIDICON
TARGET
L501
320μH
C501
0.033μF100V
Q501
C512
47μF
6.3V
Q5001
Q5002
Q5003
Q5004
CN206
1 PRE VIDEOOUT
2 +8.8V IN
3
4 TARGET VOLTAGE IN
TO PROCESS
CIRCUIT BOARD
R501 5.6M
R503 2.7M
D501
MA26
R502 100K
C503 47μF6.3V
R504
180
R5006 1.2K
C5001 0.015μF
R5007 6.8K
R5008 3K
R5009 120
R5010 1.2K
R5017 220
R5012 560
R5015
68
R5013
8.2K
R5014
100K
VC501
FREQUENCY
RESPONSE
R505
68K
VC501
40PF
C511
22PF
C505
47μF6.3V
C507
6PF
C508
4.7μF10V
C506
47μF10V

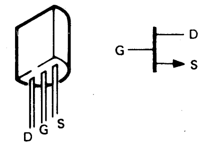
# CONDUCTOR VIEW OF PREAMPLIFIER CIRCUIT BOARD (YWV3030ZK05)


GROUND
VC501
FREQUENCY
RESPONSE
ADJUST
TO TARGET
R503 2.7M
C503 47μF6.3V
40PF
D501
C505 47μF6.3V
R505 68K
C506 47μF10V
C511 22PF
C508 4.7μF10V
C509 47μF10V
L501 320μH
C501 0.033μF
Q501
R504 180
R501 5.6M
C512 47μF6.3V
C510 2PF
C507 6PF
L502 8.2μH
MN73
YWV3000
ZR05
IC501
R502 100K
C502 0.22μF 50V
PRE VIDEO OUT
+8.8V IN
TARGET VOLTAGE IN
1
2
4
CN206

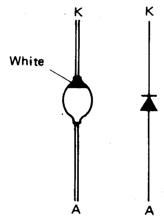
EHMK720A57



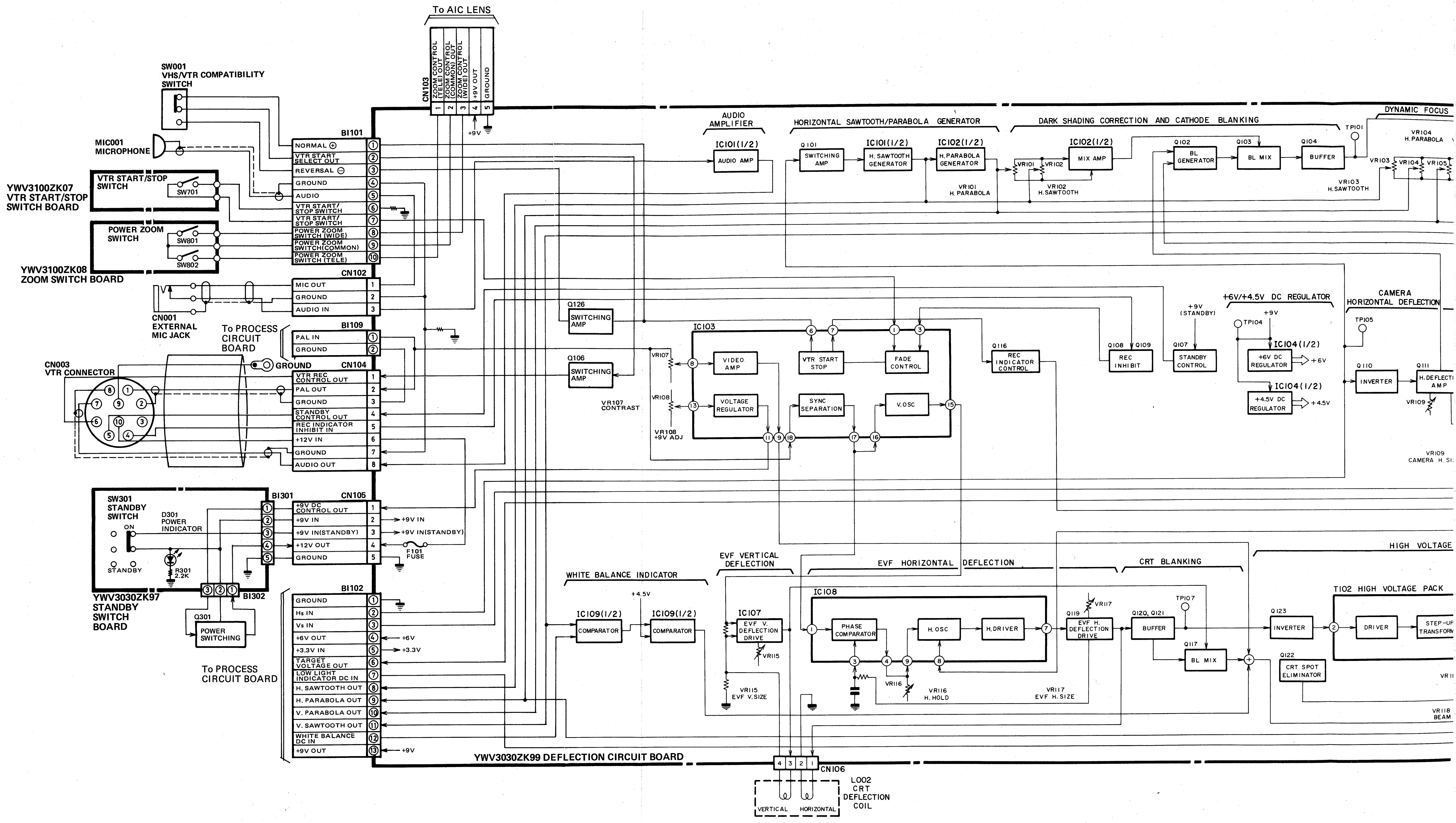
2SK218-QR



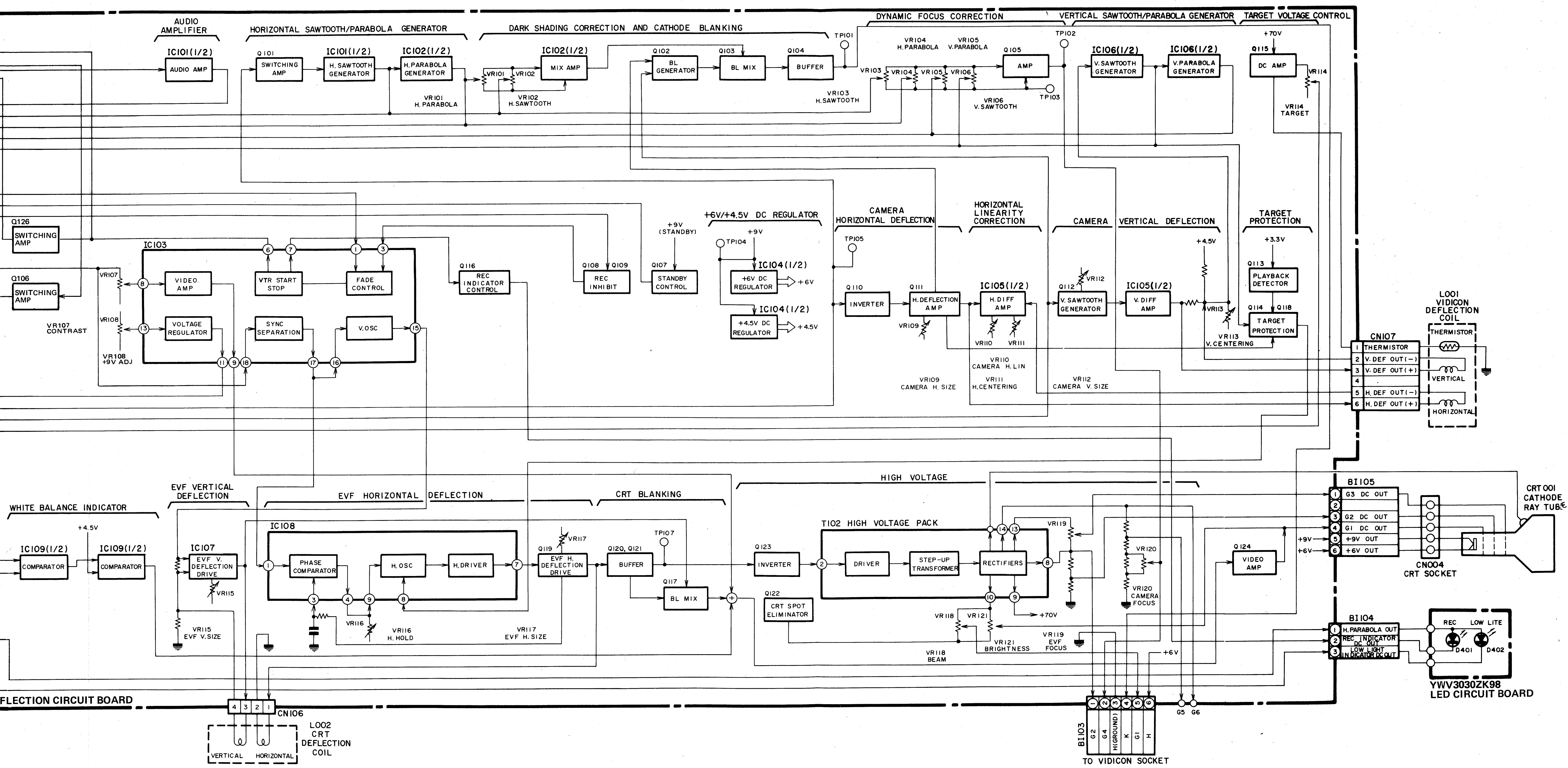
MA26



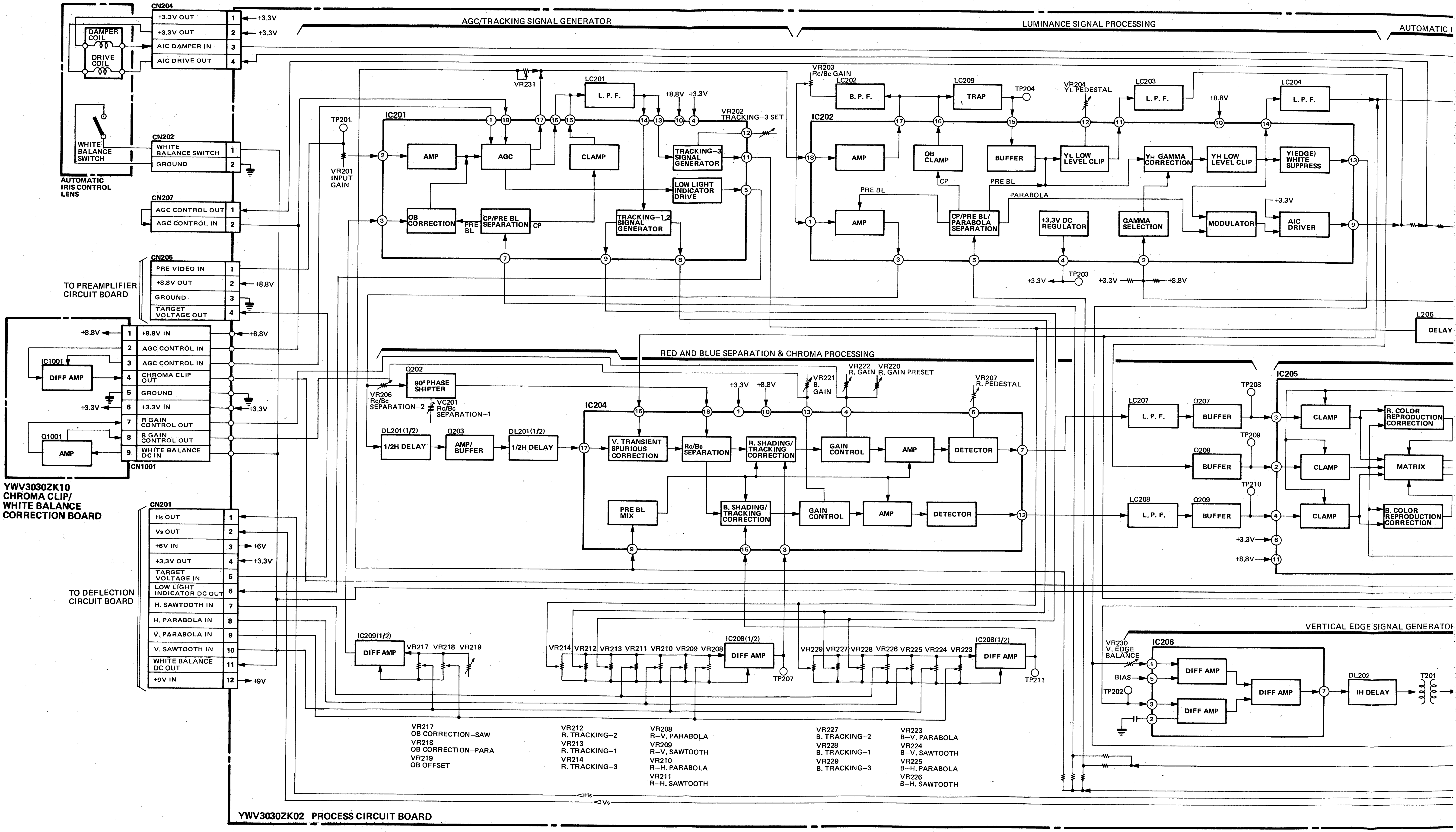
# BLOCK DIAGRAM OF DEFLECTION CIRCUIT BOARD (YWV3030ZK99)


To AIC LENS
CN103
ZOOM CONTROL (TELE) OUT
ZOOM CONTROL (COMMON) OUT
ZOOM CONTROL (WIDE) OUT
+9V OUT
GROUND
+9V
SW001
VHS/VTR COMPATIBILITY SWITCH
MIC001
MICROPHONE
YWV3100ZK07
VTR START/STOP SWITCH BOARD
VTR START/STOP SWITCH
SW701
POWER ZOOM SWITCH
SW801
SW802
YWV3100ZK08
ZOOM SWITCH BOARD
BI101
NORMAL ⊕
VTR START SELECT OUT
REVERSAL ⊖
GROUND
AUDIO
VTR START/STOP SWITCH
VTR START/STOP SWITCH
POWER ZOOM SWITCH (WIDE)
POWER ZOOM SWITCH(COMMON)
POWER ZOOM SWITCH (TELE)
CN102
MIC OUT
GROUND
AUDIO IN
CN001
EXTERNAL MIC JACK
To PROCESS CIRCUIT BOARD
BI109
PAL IN
GROUND
GROUND
CN104
CN003
VTR CONNECTOR
VTR REC CONTROL OUT
PAL OUT
GROUND
STANDBY CONTROL OUT
REC INDICATOR INHIBIT IN
+12V IN
GROUND
AUDIO OUT
SW301
STANDBY SWITCH
ON
STANDBY
D301
POWER INDICATOR
R301
2.2K
BI301
CN105
+9V DC CONTROL OUT
+9V IN
+9V IN(STANDBY)
+12V OUT
GROUND
+9V IN
+9V IN(STANDBY)
F101
FUSE
YWV3030ZK97
STANDBY SWITCH BOARD
BI302
Q301
POWER SWITCHING
To PROCESS CIRCUIT BOARD
BI102
GROUND
Hs IN
Vs IN
+6V OUT
+3.3V IN
TARGET VOLTAGE OUT
LOW LIGHT INDICATOR DC IN
H. SAWTOOTH OUT
H. PARABOLA OUT
V. PARABOLA OUT
V. SAWTOOTH OUT
WHITE BALANCE DC IN
+9V OUT
+6V
+3.3V
+9V
YWV3030ZK99 DEFLECTION CIRCUIT BOARD
AUDIO AMPLIFIER
IC101(1/2)
AUDIO AMP
HORIZONTAL SAWTOOTH/PARABOLA GENERATOR
Q101
SWITCHING AMP
IC101(1/2)
H. SAWTOOTH GENERATOR
IC102(1/2)
H. PARABOLA GENERATOR
VR101
H. PARABOLA
DARK SHADING CORRECTION AND CATHODE BLANKING
VR101
VR102
VR102
H. SAWTOOTH
IC102(1/2)
MIX AMP
Q102
BL GENERATOR
Q103
BL MIX
Q104
BUFFER
TP101
DYNAMIC FOCUS
VR104
H. PARABOLA
VR103
VR104
VR105
VR103
H. SAWTOOTH
Q126
SWITCHING AMP
Q106
SWITCHING AMP
IC103
VR107
VR108
VIDEO AMP
VOLTAGE REGULATOR
VTR START STOP
FADE CONTROL
SYNC SEPARATION
V. OSC
VR107
CONTRAST
VR108
+9V ADJ
Q116
REC INDICATOR CONTROL
Q108
Q109
REC INHIBIT
+9V
(STANDBY)
Q107
STANDBY CONTROL
+6V/+4.5V DC REGULATOR
+9V
TP104
IC104(1/2)
+6V DC REGULATOR
+6V
IC104(1/2)
+4.5V DC REGULATOR
+4.5V
CAMERA HORIZONTAL DEFLECTION
TP105
Q110
INVERTER
Q111
H. DEFLECTI
AMP
VR109
VR109
CAMERA H. SI
HIGH VOLTAGE
WHITE BALANCE INDICATOR
+4.5V
IC109(1/2)
COMPARATOR
IC109(1/2)
COMPARATOR
EVF VERTICAL DEFLECTION
IC107
EVF V. DEFLECTION DRIVE
VR115
VR115
EVF V. SIZE
EVF HORIZONTAL DEFLECTION
IC108
PHASE COMPARATOR
H. OSC
H. DRIVER
VR116
VR116
H. HOLD
Q119
VR117
EVF H. DEFLECTION DRIVE
VR117
EVF H. SIZE
CRT BLANKING
Q120, Q121
BUFFER
TP107
Q117
BL MIX
Q123
INVERTER
Q122
CRT SPOT ELIMINATOR
T102 HIGH VOLTAGE PACK
DRIVER
STEP-UP
TRANSFORM
VR11
VR118
BEAM
CN106
L002
CRT DEFLECTION COIL
VERTICAL
HORIZONTAL

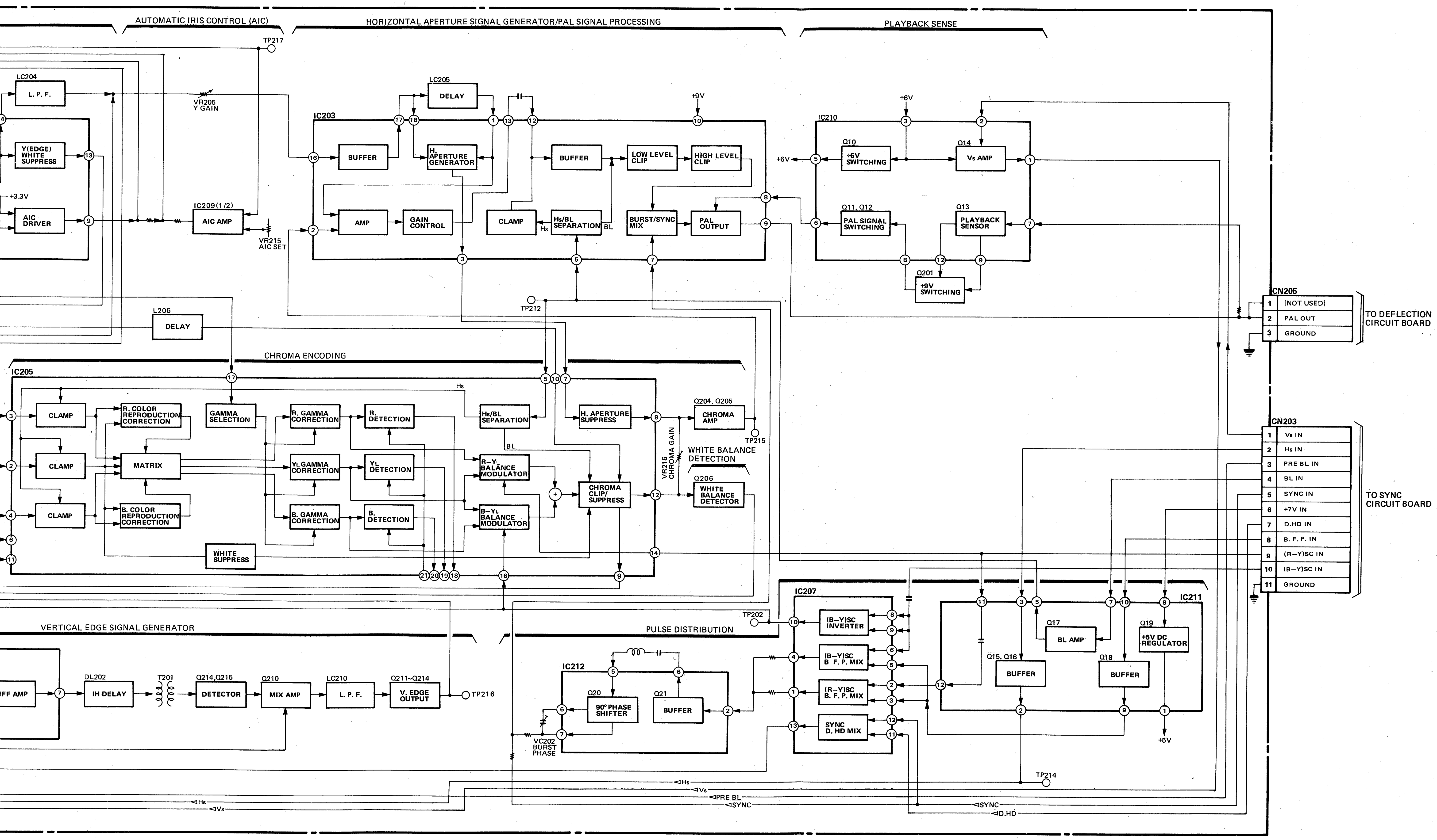
# BLOCK DIAGRAM OF DEFLECTION CIRCUIT BOARD (YWV3030ZK99)


AUDIO AMPLIFIER
IC101(1/2)
AUDIO AMP
HORIZONTAL SAWTOOTH/PARABOLA GENERATOR
Q101
SWITCHING AMP
IC101(1/2)
H. SAWTOOTH GENERATOR
IC102(1/2)
H. PARABOLA GENERATOR
VR101
H. PARABOLA
DARK SHADING CORRECTION AND CATHODE BLANKING
IC102(1/2)
MIX AMP
VR102
H. SAWTOOTH
Q102
BL GENERATOR
Q103
BL MIX
Q104
BUFFER
TP101
DYNAMIC FOCUS CORRECTION
VR104
H. PARABOLA
VR105
V. PARABOLA
Q105
AMP
VR103
VR104
VR105
VR106
VR103
H. SAWTOOTH
VR106
V. SAWTOOTH
TP102
TP103
VERTICAL SAWTOOTH/PARABOLA GENERATOR
IC106(1/2)
V. SAWTOOTH GENERATOR
IC106(1/2)
V. PARABOLA GENERATOR
TARGET VOLTAGE CONTROL
+70V
Q115
DC AMP
VR114
VR114
TARGET
Q126
SWITCHING AMP
Q106
SWITCHING AMP
IC103
VR107
VR108
VR107
CONTRAST
VR108
+9V ADJ
VIDEO AMP
VOLTAGE REGULATOR
VTR START STOP
SYNC SEPARATION
FADE CONTROL
V. OSC
Q116
REC INDICATOR CONTROL
Q108
Q109
REC INHIBIT
+9V
(STANDBY)
Q107
STANDBY CONTROL
+6V/+4.5V DC REGULATOR
+9V
TP104
IC104(1/2)
+6V DC REGULATOR
+6V
IC104(1/2)
+4.5V DC REGULATOR
+4.5V
CAMERA HORIZONTAL DEFLECTION
TP105
Q110
INVERTER
Q111
H. DEFLECTION AMP
VR109
VR109
CAMERA H. SIZE
HORIZONTAL LINEARITY CORRECTION
IC105(1/2)
H. DIFF AMP
VR110
VR111
VR110
CAMERA H. LIN
VR111
H. CENTERING
CAMERA VERTICAL DEFLECTION
Q112
VR112
V. SAWTOOTH GENERATOR
IC105(1/2)
V. DIFF AMP
+4.5V
VR113
VR113
V. CENTERING
VR112
CAMERA V. SIZE
TARGET PROTECTION
+3.3V
Q113
PLAYBACK DETECTOR
Q114
Q118
TARGET PROTECTION
CN107
1 THERMISTOR
2 V. DEF OUT(−)
3 V. DEF OUT(+)
4
5 H. DEF OUT(−)
6 H. DEF OUT(+)
L001
VIDICON DEFLECTION COIL
THERMISTOR
VERTICAL
HORIZONTAL
WHITE BALANCE INDICATOR
+4.5V
IC109(1/2)
COMPARATOR
IC109(1/2)
COMPARATOR
EVF VERTICAL DEFLECTION
IC107
EVF V. DEFLECTION DRIVE
VR115
VR115
EVF V. SIZE
EVF HORIZONTAL DEFLECTION
IC108
PHASE COMPARATOR
H. OSC
H. DRIVER
VR116
VR116
H. HOLD
Q119
VR117
EVF H. DEFLECTION DRIVE
VR117
EVF H. SIZE
CRT BLANKING
Q120, Q121
BUFFER
TP107
Q117
BL MIX
HIGH VOLTAGE
Q123
INVERTER
Q122
CRT SPOT ELIMINATOR
T102 HIGH VOLTAGE PACK
DRIVER
STEP-UP TRANSFORMER
RECTIFIERS
+70V
VR118
VR121
VR118
BEAM
VR121
BRIGHTNESS
VR119
VR119
EVF FOCUS
VR120
VR120
CAMERA FOCUS
Q124
VIDEO AMP
+9V
+6V
+6V
BI105
1 G3 DC OUT
2
3 G2 DC OUT
4 G1 DC OUT
5 +9V OUT
6 +6V OUT
CN004
CRT SOCKET
CRT001
CATHODE RAY TUBE
BI104
1 H. PARABOLA OUT
2 REC INDICATOR DC OUT
3 LOW LIGHT INDICATOR DC OUT
REC
LOW LITE
D401
D402
YWV3030ZK98
LED CIRCUIT BOARD
FLECTION CIRCUIT BOARD
CN106
4 3 2 1
L002
CRT DEFLECTION COIL
VERTICAL
HORIZONTAL
BI103
G2
G4
H(GROUND)
K
G1
H
G5
G6
TO VIDICON SOCKET

# BLOCK DIAGRAM OF PROCESS CIRCUI

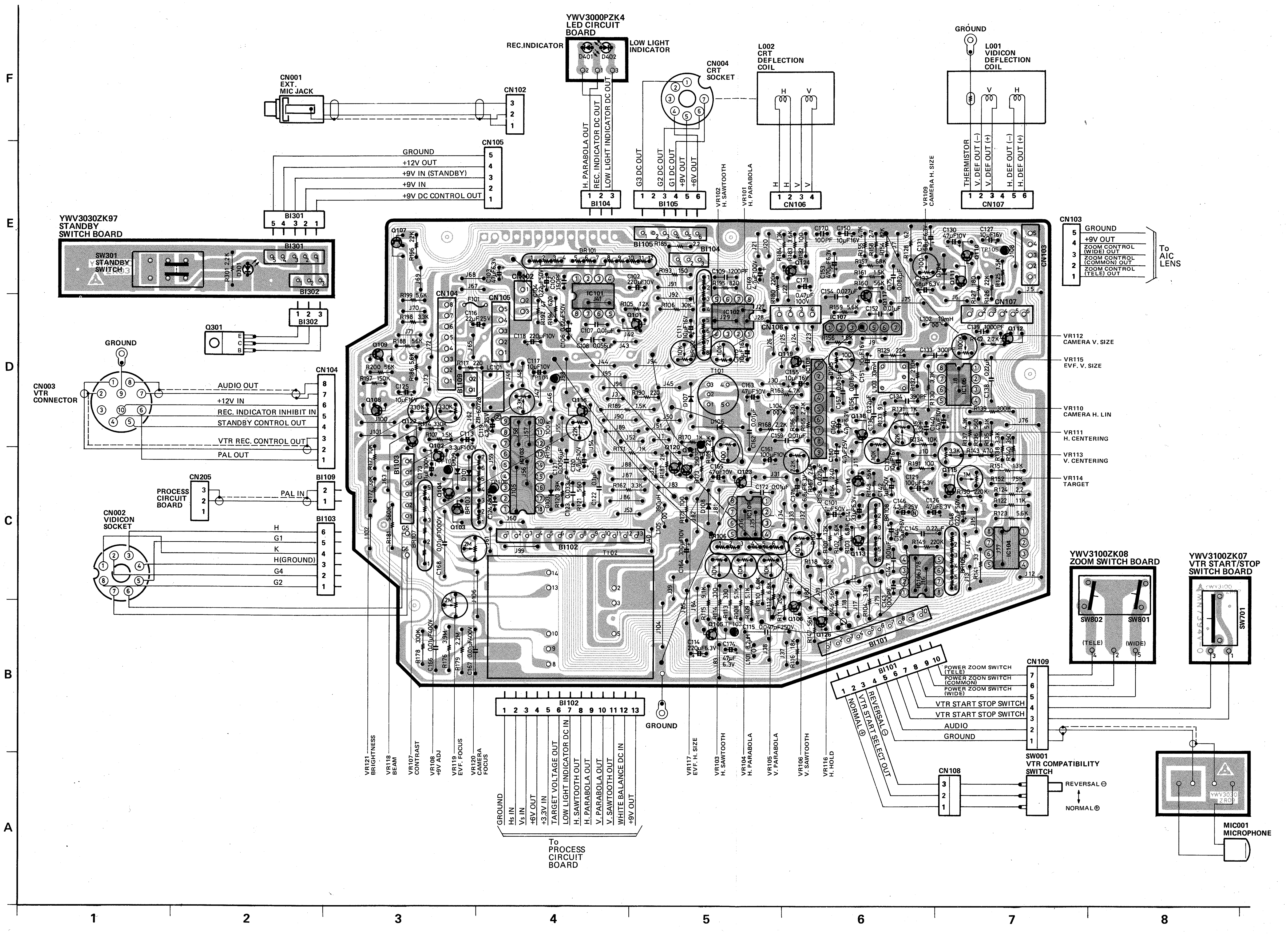

CN204
+3.3V OUT
+3.3V OUT
AIC DAMPER IN
AIC DRIVE OUT
+3.3V
+3.3V
DAMPER COIL
DRIVE COIL
WHITE BALANCE SWITCH
AUTOMATIC IRIS CONTROL LENS
CN202
WHITE BALANCE SWITCH
GROUND
CN207
AGC CONTROL OUT
AGC CONTROL IN
CN206
PRE VIDEO IN
+8.8V OUT
GROUND
TARGET VOLTAGE OUT
+8.8V
TO PREAMPLIFIER CIRCUIT BOARD
+8.8V
+8.8V IN
AGC CONTROL IN
AGC CONTROL IN
CHROMA CLIP OUT
GROUND
+3.3V IN
R GAIN CONTROL OUT
B GAIN CONTROL OUT
WHITE BALANCE DC IN
CN1001
IC1001
DIFF AMP
+3.3V
Q1001
AMP
+8.8V
+3.3V
YWV3030ZK10 CHROMA CLIP/ WHITE BALANCE CORRECTION BOARD
CN201
Hs OUT
Vs OUT
+6V IN
+3.3V OUT
TARGET VOLTAGE IN
LOW LIGHT INDICATOR DC OUT
H. SAWTOOTH IN
H. PARABOLA IN
V. PARABOLA IN
V. SAWTOOTH IN
WHITE BALANCE DC OUT
+9V IN
+6V
+3.3V
+9V
TO DEFLECTION CIRCUIT BOARD
AGC/TRACKING SIGNAL GENERATOR
VR231
LC201
L. P. F.
+8.8V
+3.3V
VR202 TRACKING-3 SET
TP201
IC201
VR201 INPUT GAIN
AMP
AGC
CLAMP
TRACKING-3 SIGNAL GENERATOR
LOW LIGHT INDICATOR DRIVE
OB CORRECTION
CP/PRE BL SEPARATION
PRE BL
CP
TRACKING-1,2 SIGNAL GENERATOR
LUMINANCE SIGNAL PROCESSING
VR203 Rc/Bc GAIN
LC202
B. P. F.
LC209
TRAP
TP204
VR204 YL PEDESTAL
LC203
L. P. F.
+8.8V
LC204
L. P. F.
IC202
AMP
OB CLAMP
BUFFER
YL LOW LEVEL CLIP
YH GAMMA CORRECTION
YH LOW LEVEL CLIP
Y(EDGE) WHITE SUPPRESS
CP
PRE BL
PRE BL
PARABOLA
AMP
CP/PRE BL/ PARABOLA SEPARATION
+3.3V DC REGULATOR
GAMMA SELECTION
MODULATOR
+3.3V
AIC DRIVER
TP203
+3.3V
+3.3V
+8.8V
AUTOMATIC I
L206
DELAY
RED AND BLUE SEPARATION & CHROMA PROCESSING
Q202
90° PHASE SHIFTER
VR206 Rc/Bc SEPARATION-2
VC201 Rc/Bc SEPARATION-1
VR222 R. GAIN
VR220 R. GAIN PRESET
VR221 B. GAIN
VR207 R. PEDESTAL
+3.3V
+8.8V
IC204
DL201(1/2)
1/2H DELAY
Q203
AMP/ BUFFER
DL201(1/2)
1/2H DELAY
V. TRANSIENT SPURIOUS CORRECTION
Rc/Bc SEPARATION
R. SHADING/ TRACKING CORRECTION
GAIN CONTROL
AMP
DETECTOR
PRE BL MIX
B. SHADING/ TRACKING CORRECTION
GAIN CONTROL
AMP
DETECTOR
IC205
TP208
LC207
L. P. F.
Q207
BUFFER
CLAMP
R. COLOR REPRODUCTION CORRECTION
TP209
Q208
BUFFER
CLAMP
MATRIX
TP210
LC208
L. P. F.
Q209
BUFFER
CLAMP
B. COLOR REPRODUCTION CORRECTION
+3.3V
+8.8V
IC209(1/2)
DIFF AMP
VR217
VR218
VR219
VR214
VR212
VR213
VR211
VR210
VR209
VR208
IC208(1/2)
DIFF AMP
TP207
VR229
VR227
VR228
VR226
VR225
VR224
VR223
IC208(1/2)
DIFF AMP
TP211
VERTICAL EDGE SIGNAL GENERATOR
VR230 V. EDGE BALANCE
IC206
BIAS
TP202
DIFF AMP
DIFF AMP
DIFF AMP
DL202
IH DELAY
T201
VR217 OB CORRECTION-SAW
VR218 OB CORRECTION-PARA
VR219 OB OFFSET
VR212 R. TRACKING-2
VR213 R. TRACKING-1
VR214 R. TRACKING-3
VR208 R-V. PARABOLA
VR209 R-V. SAWTOOTH
VR210 R-H. PARABOLA
VR211 R-H. SAWTOOTH
VR227 B. TRACKING-2
VR228 B. TRACKING-1
VR229 B. TRACKING-3
VR223 B-V. PARABOLA
VR224 B-V. SAWTOOTH
VR225 B-H. PARABOLA
VR226 B-H. SAWTOOTH
Hs
Vs
YWV3030ZK02 PROCESS CIRCUIT BOARD

# PROCESS CIRCUIT BOARD (YWV3030ZK02)

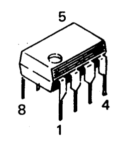


AUTOMATIC IRIS CONTROL (AIC)
HORIZONTAL APERTURE SIGNAL GENERATOR/PAL SIGNAL PROCESSING
PLAYBACK SENSE
TP217
LC204
L. P. F.
VR205
Y GAIN
Y(EDGE) WHITE SUPPRESS
+3.3V
AIC DRIVER
IC209(1/2)
AIC AMP
VR215
AIC SET
LC205
DELAY
IC203
BUFFER
H. APERTURE GENERATOR
AMP
GAIN CONTROL
CLAMP
Hs/BL SEPARATION
Hs
BL
BUFFER
LOW LEVEL CLIP
HIGH LEVEL CLIP
BURST/SYNC MIX
PAL OUTPUT
+9V
+6V
IC210
Q10
+6V SWITCHING
Q14
Vs AMP
Q11, Q12
PAL SIGNAL SWITCHING
Q13
PLAYBACK SENSOR
Q201
+9V SWITCHING
TP212
L206
DELAY
CN205
1 [NOT USED]
2 PAL OUT
3 GROUND
TO DEFLECTION CIRCUIT BOARD
CHROMA ENCODING
IC205
CLAMP
CLAMP
CLAMP
R. COLOR REPRODUCTION CORRECTION
MATRIX
B. COLOR REPRODUCTION CORRECTION
GAMMA SELECTION
WHITE SUPPRESS
R. GAMMA CORRECTION
YL GAMMA CORRECTION
B. GAMMA CORRECTION
R. DETECTION
YL DETECTION
B. DETECTION
Hs/BL SEPARATION
R−YL BALANCE MODULATOR
B−YL BALANCE MODULATOR
H. APERTURE SUPPRESS
CHROMA CLIP/ SUPPRESS
VR216 CHROMA GAIN
Q204, Q205
CHROMA AMP
TP215
WHITE BALANCE DETECTION
Q206
WHITE BALANCE DETECTOR
CN203
1 Vs IN
2 Hs IN
3 PRE BL IN
4 BL IN
5 SYNC IN
6 +7V IN
7 D.HD IN
8 B. F. P. IN
9 (R−Y)SC IN
10 (B−Y)SC IN
11 GROUND
TO SYNC CIRCUIT BOARD
VERTICAL EDGE SIGNAL GENERATOR
IFF AMP
DL202
IH DELAY
T201
Q214,Q215
DETECTOR
Q210
MIX AMP
LC210
L. P. F.
Q211~Q214
V. EDGE OUTPUT
TP216
PULSE DISTRIBUTION
IC212
Q20
90° PHASE SHIFTER
Q21
BUFFER
VC202
BURST PHASE
IC207
TP202
(B−Y)SC INVERTER
(B−Y)SC B. F. P. MIX
(R−Y)SC B. F. P. MIX
SYNC D. HD MIX
IC211
Q17
BL AMP
Q19
+5V DC REGULATOR
Q15, Q16
BUFFER
Q18
BUFFER
+5V
TP214
Hs
Vs
PRE BL
SYNC
SYNC
D.HD
Hs
Vs

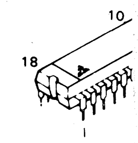
# CONDUCTOR VIEW OF DEFLECTION CIRCUIT BOARD (YWV3030ZK99)


YWV3000PZK4
LED CIRCUIT BOARD
REC.INDICATOR
LOW LIGHT INDICATOR
D401
D402
CN001
EXT. MIC JACK
CN102
CN004
CRT SOCKET
L002
CRT DEFLECTION COIL
GROUND
L001
VIDICON DEFLECTION COIL
THERMISTOR
V. DEF OUT (−)
V. DEF OUT (+)
H. DEF OUT (−)
H. DEF OUT (+)
CN107
H. PARABOLA OUT
REC. INDICATOR DC OUT
LOW LIGHT INDICATOR DC OUT
BI104
G3 DC OUT
G2 DC OUT
G1 DC OUT
+9V OUT
+6V OUT
BI105
VR102
H. SAWTOOTH
VR101
H. PARABOLA
CN106
VR109
CAMERA H. SIZE
CN105
GROUND
+12V OUT
+9V IN (STANDBY)
+9V IN
+9V DC CONTROL OUT
BI301
YWV3030ZK97
STANDBY SWITCH BOARD
SW301
STANDBY SWITCH
BI302
Q301
CN103
GROUND
+9V OUT
ZOOM CONTROL (WIDE) OUT
ZOOM CONTROL (COMMON) OUT
ZOOM CONTROL (TELE) OUT
To AIC LENS
CN003
VTR CONNECTOR
CN104
AUDIO OUT
+12V IN
REC. INDICATOR INHIBIT IN
STANDBY CONTROL OUT
VTR REC. CONTROL OUT
PAL OUT
VR112
CAMERA V. SIZE
VR115
EVF. V. SIZE
VR110
CAMERA H. LIN
VR111
H. CENTERING
VR113
V. CENTERING
VR114
TARGET
CN205
PROCESS CIRCUIT BOARD
PAL IN
BI109
CN002
VIDICON SOCKET
BI103
H
G1
K
H(GROUND)
G4
G2
YWV3100ZK08
ZOOM SWITCH BOARD
SW802
SW801
(TELE)
(WIDE)
YWV3100ZK07
VTR START/STOP SWITCH BOARD
SW701
BI101
CN109
POWER ZOOM SWITCH (TELE)
POWER ZOOM SWITCH (COMMON)
POWER ZOOM SWITCH (WIDE)
VTR START STOP SWITCH
VTR START STOP SWITCH
AUDIO
GROUND
NORMAL⊕
VTR START SELECT OUT
REVERSAL⊖
CN108
SW001
VTR COMPATIBILITY SWITCH
REVERSAL⊖
NORMAL⊕
MIC001
MICROPHONE
BI102
GROUND
VR121
BRIGHTNESS
VR118
BEAM
VR107
CONTRAST
VR108
+9V ADJ
VR119
EVF. FOCUS
VR120
CAMERA FOCUS
GROUND
Hs IN
Vs IN
+6V OUT
+3.3V IN
TARGET VOLTAGE OUT
LOW LIGHT INDICATOR DC IN
H. SAWTOOTH OUT
H. PARABOLA OUT
V. PARABOLA OUT
V. SAWTOOTH OUT
WHITE BALANCE DC IN
+9V OUT
To PROCESS CIRCUIT BOARD
VR117
EVF. H. SIZE
VR103
H. SAWTOOTH
VR104
H. PARABOLA
VR105
V. PARABOLA
VR106
V. SAWTOOTH
VR116
H. HOLD
IC101
IC102
IC103
IC104
IC105
IC106
IC107
IC108
IC109
T101
T102
BR101
F
E
D
C
B
A
1
2
3
4
5
6
7
8

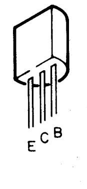
AN6914
NJM4556D
NJM4556DT
NJM4560D
YHSNJM4558D



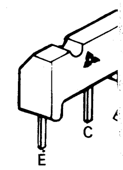
AN6055



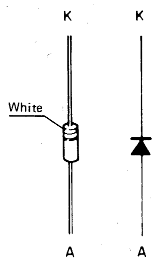
2SA749A
2SA838-CD
2SC1473NCQRS
2SC1980-RST



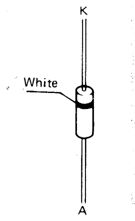
2SB641-QRS
2SC2377-CD
2SD636-QRS
2SD638-QRS
2SD661-TU



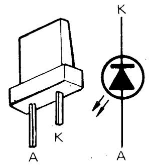
MA165



YUDRU2M

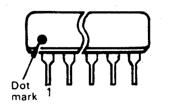


LN217RP



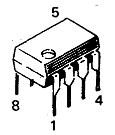
| | | |
|---|---|---|
| IC101 | YHSNJM4558D | D4 |
| IC102 | NJM4560D | D5 |
| IC103 | AN6055 | C4 |
| IC104 | NJM4556D | D7 |
| IC105 | NJM4556DT | C7 |
| IC106 | YHSNJM4558D | C6 |
| IC107 | AN374P | D6 |
| IC108 | AN5750 | D6 |
| IC109 | AN6914 | C5 |
| Q101 | 2SC2377–CD | D5 |
| Q102 | 2SC2377–CD | C3 |
| Q103 | 2SA749A | C3 |
| Q104 | 2SA749A | C3 |
| Q105 | 2SC1980–RST | B5 |
| Q106 | 2SD636–QRS | B6 |
| Q107 | 2SB641–QRS | E3 |
| Q108 | 2SD636–QRS | D3 |
| Q109 | 2SB641–QRS | D3 |
| Q110 | 2SD638–QR | E7 |
| Q111 | 2SD975 | E7 |
| Q112 | 2SD638–QR | D7 |
| Q113 | 2SB641–QRS | C6 |
| Q114 | 2SD636–QRS | C6 |
| Q115 | 2SC1473NC–QRS | C7 |
| Q116 | 2SD661–TU | D4 |
| Q117 | 2SB641–QRS | D6 |
| Q118 | 2SD636–QRS | D6 |
| Q119 | 2SD975 | D6 |
| Q120 | 2SC2377–CD | C5 |
| Q121 | 2SA838–CD | C5 |
| Q122 | 2SA749A | D3 |
| Q123 | 2SD638–QR | C5 |
| Q124 | 2SC1980–RST | E6 |
| Q126 | 2SD636–QRS | B6 |
| D101 | MA165 | C3 |
| D102 | MA165 | C6 |
| D103 | MA165 | C4 |
| D104 | MA165 | E7 |
| D105 | MA165 | D6 |
| D106 | YUDRU2M | D5 |
| D107 | MA165 | D5 |
| D108 | MA165 | C5 |
| D109 | MA165 | C3 |
| D301 | LN217RP | E2 |
| D401 | LN23SRP,D | F4 |
| D402 | LN43SYP | F4 |

BLOCK RESISTOR

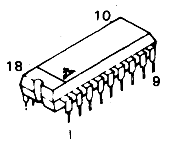


(Dot indicates pin No. 1 side)

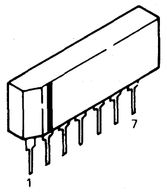
AN6914
NJM4556D
NJM4556DT
NJM4560D
YHSNJM4558D



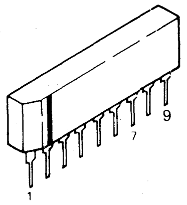
AN6055



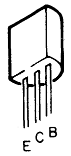
AN374P



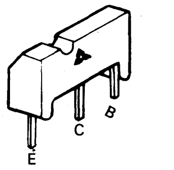
AN5750



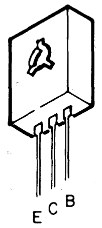
2SA749A
2SA838-CD
2SC1473NCQRS
2SC1980-RST



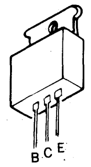
2SB641-QRS
2SC2377-CD
2SD636-QRS
2SD638-QRS
2SD661-TU



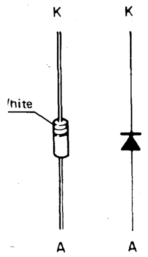
2SD975



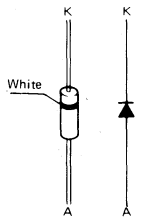
2SA1061-P



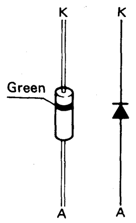
MA165



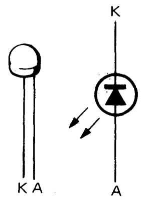
YUDRU2M



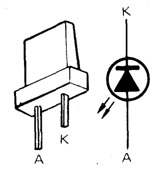
YUD1S2688



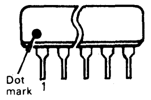
LN23SRP-D
LN43SYP



LN217RP



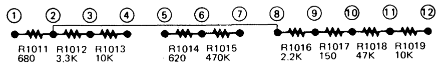
BLOCK RESISTOR



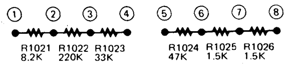
(Dot indicates
pin No. 1 side)

## INTERNAL CONNECTION OF BLOCK RESISTORS

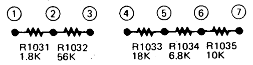
**BR101**
**EXBH89119JB**


①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
R1011 680
R1012 3.3K
R1013 10K
R1014 620
R1015 470K
R1016 2.2K
R1017 150
R1018 47K
R1019 10K

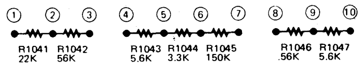
**BR102**
**EXBH86120JB**


①
②
③
④
⑤
⑥
⑦
⑧
R1021 8.2K
R1022 220K
R1023 33K
R1024 47K
R1025 1.5K
R1026 1.5K

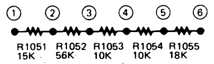
**BR103**
**EXBH85149JB**


①
②
③
④
⑤
⑥
⑦
R1031 1.8K
R1032 56K
R1033 18K
R1034 6.8K
R1035 10K

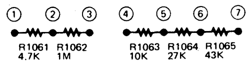
**BR104**
**EXBH87121JB**


①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
R1041 22K
R1042 56K
R1043 5.6K
R1044 3.3K
R1045 150K
R1046 .56K
R1047 5.6K

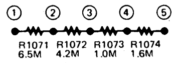
**BR105**
**EXBH85178JB**


①
②
③
④
⑤
⑥
R1051 15K
R1052 56K
R1053 10K
R1054 10K
R1055 18K

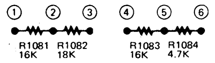
**BR106**
**EXBH85131JB**


①
②
③
④
⑤
⑥
⑦
R1061 4.7K
R1062 1M
R1063 10K
R1064 27K
R1065 43K

**BR107**
**YWA100**

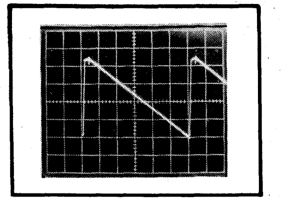

①
②
③
④
⑤
R1071 6.5M
R1072 4.2M
R1073 1.0M
R1074 1.6M

**BR108**
**EXBH84167JB**

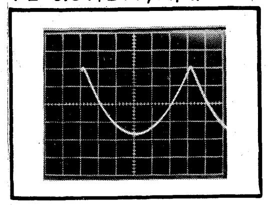

①
②
③
④
⑤
⑥
R1081 16K
R1082 18K
R1083 16K
R1084 4.7K

## SIGNAL WAVEFORMS OF DEFLECTION CIRCUIT BOARD

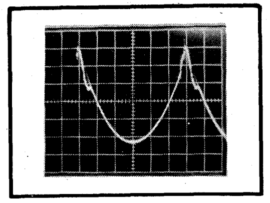
1-1 0.5V/DIV,10µs/DIV



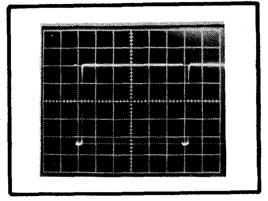
1-2 0.5V/DIV,10µs/DIV



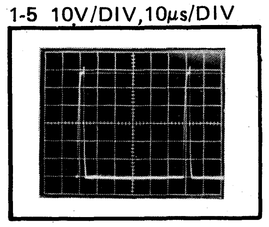
1-3 0.1V/DIV,10µs/DIV



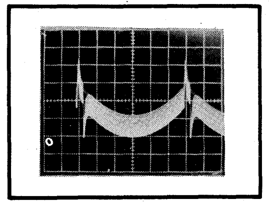
1-4 2V/DIV,10µs/DIV



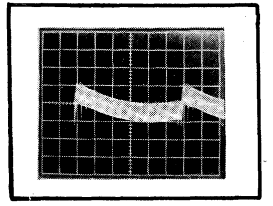
1-5 10V/DIV,10µs/DIV



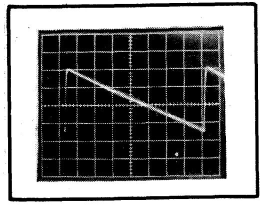
1-6 1V/DIV,10µs/DIV



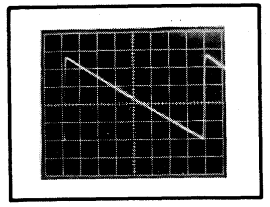
1-7 0.05V/DIV,10µs/DIV



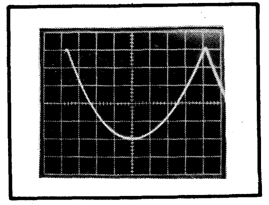
1-8 0.1V/DIV,2ms/DIV



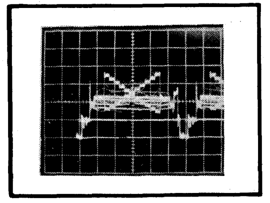
1-9 0.5V/DIV,2ms/DIV



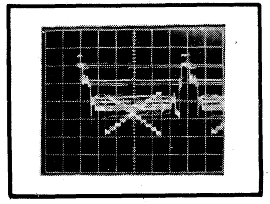
1-10 0.5V/DIV,2ms/DIV



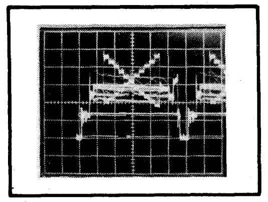
1-11 0.2V/DIV,10µs/DIV



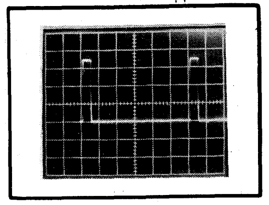
1-12 1V/DIV,10µs/DIV



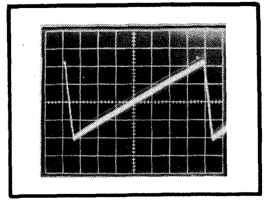
1-13 0.2V/DIV,10µs/DIV



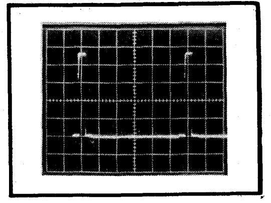
1-14 2V/DIV,10µs/DIV



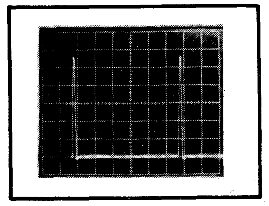
1-15 0.01V/DIV, 2ms/DIV



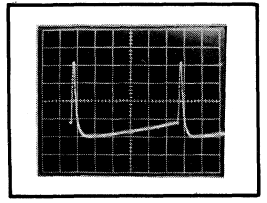
1-16 1V/DIV,10µs/DIV



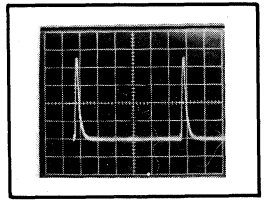
1-17 20V/DIV,10µs/DIV



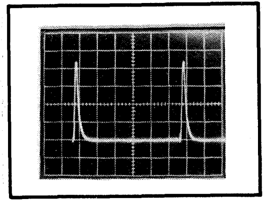
1-18 1V/DIV,10µs/DIV



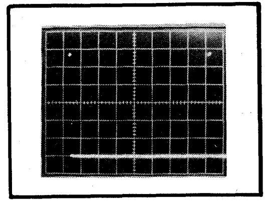
1-19 0.2V/DIV,10µs/DIV



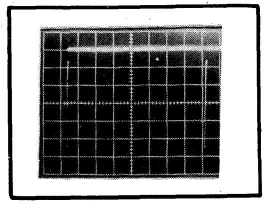
1-20 0.2V/DIV,10µs/DIV



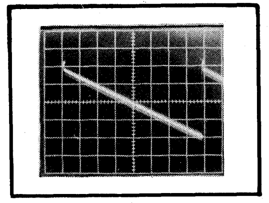
1-21 1V/DIV,2ms/DIV



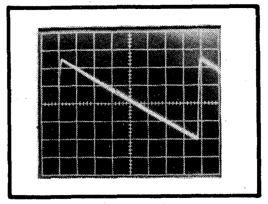
1-22 0.2V/DIV,2ms/DIV



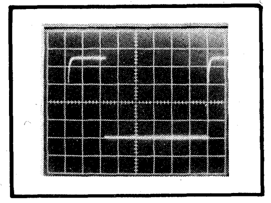
1-23 1V/DIV,2ms/DIV



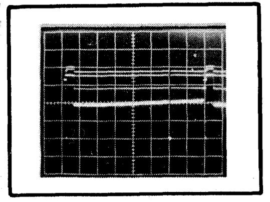
1-24 0.2V/DIV,2ms/DIV



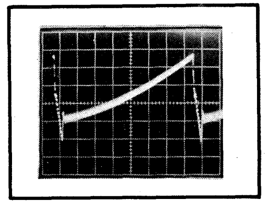
1-25 2V/DIV,2ms/DIV



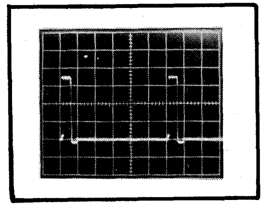
1-26 2V/DIV,2ms/DIV



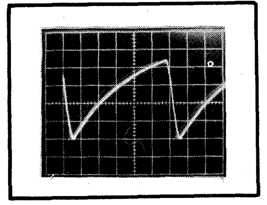
1-27 1V/DIV,2ms/DIV



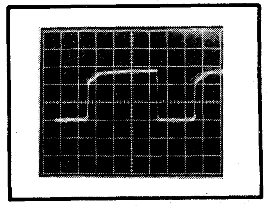
1-28 0.5V/DIV,10µs/DIV



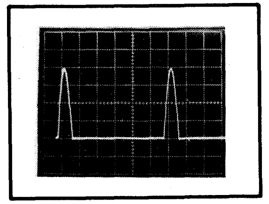
1-29 0.5V/DIV,10µs/DIV



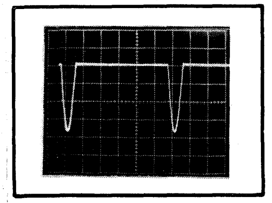
1-30 0.5V/DIV,10µs/DIV



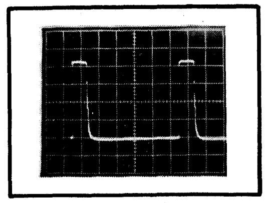
1-31 20V/DIV,10µs/DIV



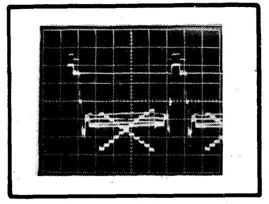
1-32 10V/DIV,10µs/DIV



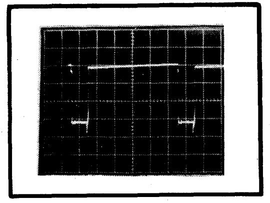
1-33 2V/DIV,10µs/DIV



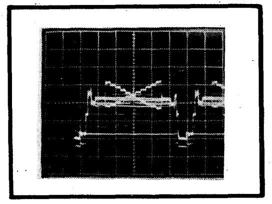
1-34 1V/DIV,10µs/DIV



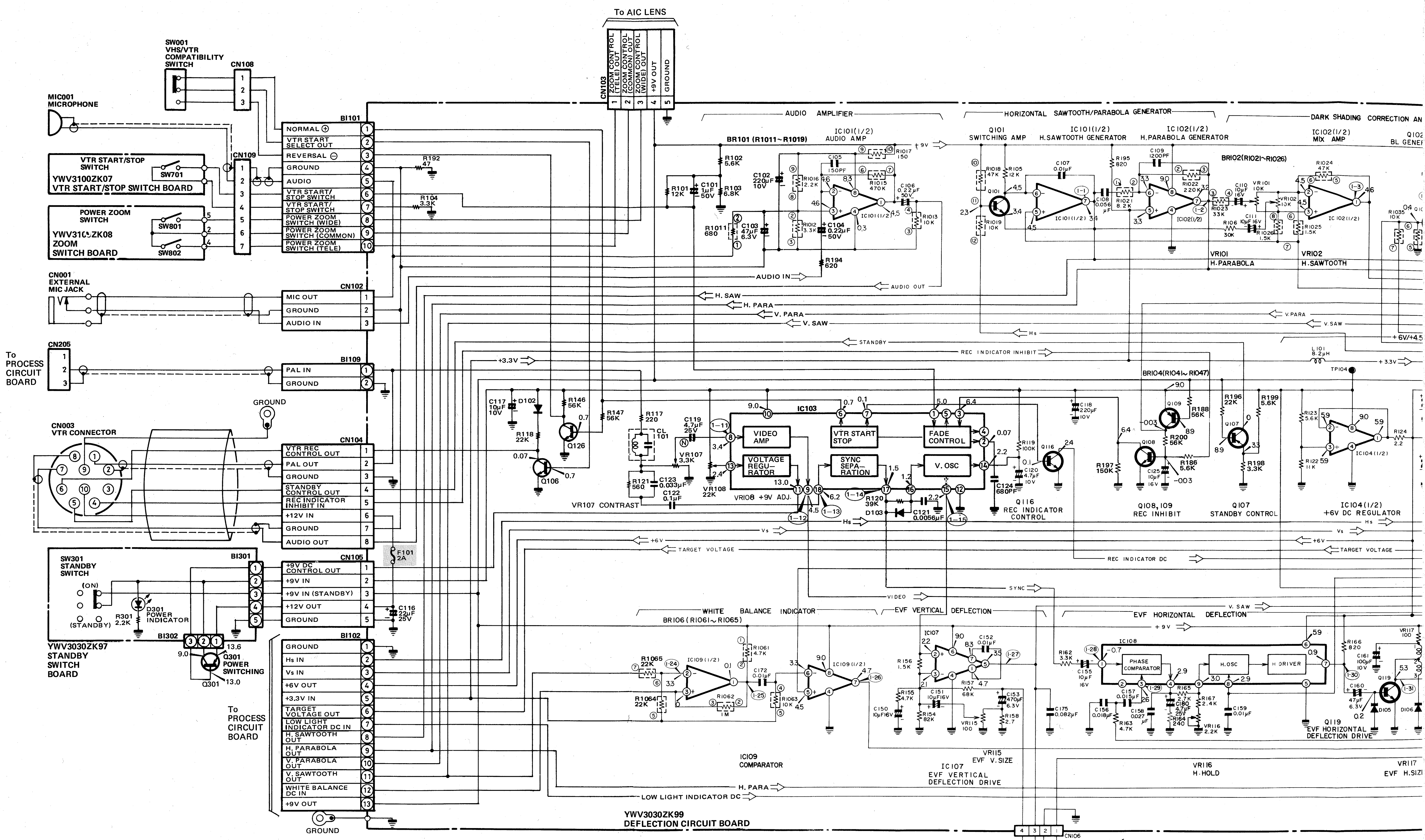
1-35 0.5V/DIV,10µs/DIV



1-36 5V/DIV,10µs/DIV



# SCHEMATIC DIAGRAM OF DEFLECTION CIRC

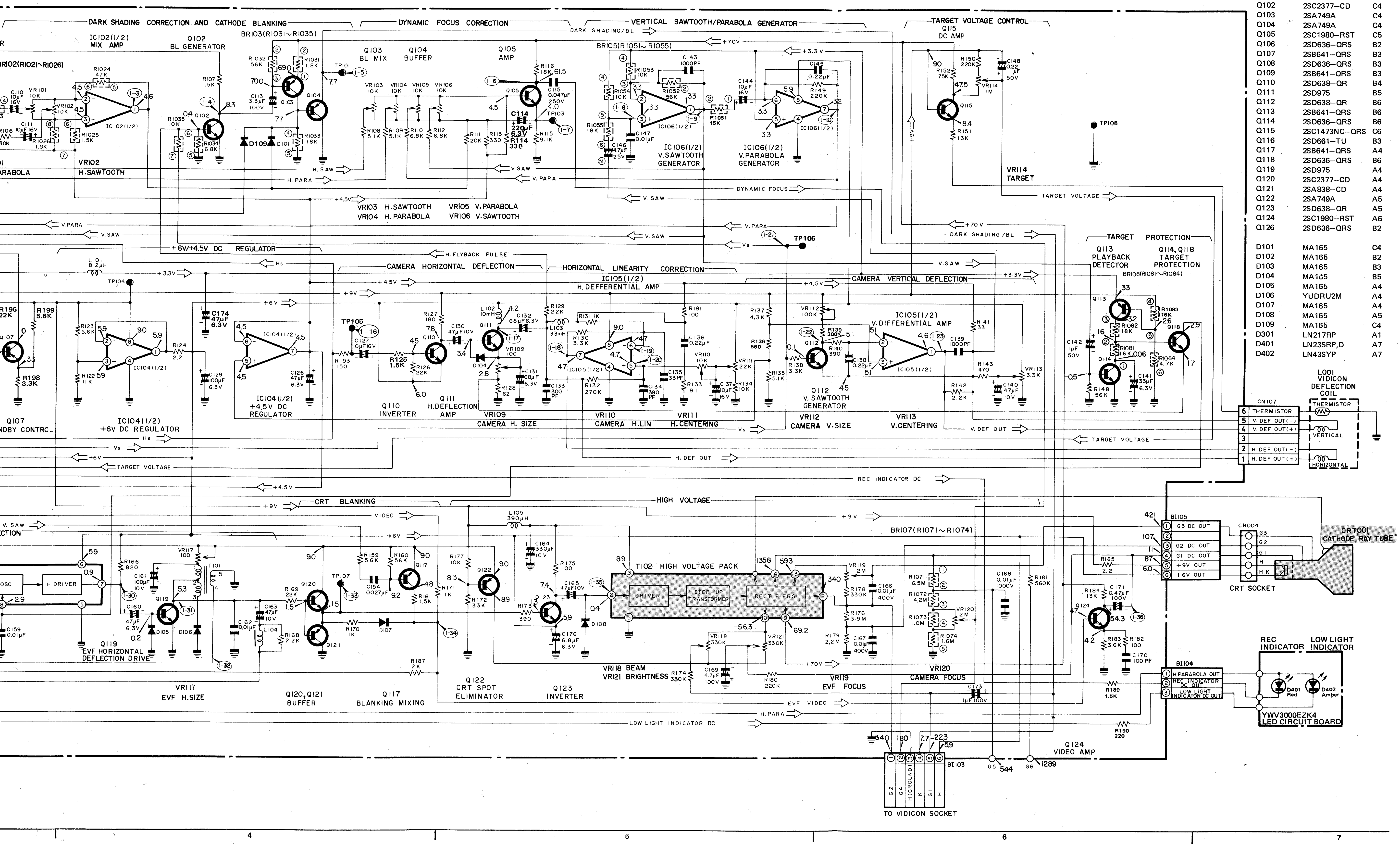

To AIC LENS
CN103
ZOOM CONTROL (TELE) OUT
ZOOM CONTROL (COMMON) OUT
ZOOM CONTROL (WIDE) OUT
+9V OUT
GROUND
SW001 VHS/VTR COMPATIBILITY SWITCH
CN108
MIC001 MICROPHONE
CN109
VTR START/STOP SWITCH
SW701
YWV3100ZK07
VTR START/STOP SWITCH BOARD
POWER ZOOM SWITCH
SW801
SW802
YWV310ZK08
ZOOM SWITCH BOARD
CN001 EXTERNAL MIC JACK
To PROCESS CIRCUIT BOARD
CN205
CN003 VTR CONNECTOR
GROUND
SW301 STANDBY SWITCH
(ON)
(STANDBY)
R301 2.2K
D301 POWER INDICATOR
YWV3030ZK97
STANDBY SWITCH BOARD
BI301
BI302
Q301 POWER SWITCHING
BI101
NORMAL ⊕
VTR START SELECT OUT
REVERSAL ⊖
GROUND
AUDIO
VTR START/STOP SWITCH
VTR START/STOP SWITCH
POWER ZOOM SWITCH (WIDE)
POWER ZOOM SWITCH (COMMON)
POWER ZOOM SWITCH (TELE)
CN102
MIC OUT
GROUND
AUDIO IN
BI109
PAL IN
GROUND
CN104
VTR REC CONTROL OUT
PAL OUT
GROUND
STANDBY CONTROL OUT
REC INDICATOR INHIBIT IN
+12V IN
GROUND
AUDIO OUT
CN105
+9V DC CONTROL OUT
+9V IN
+9V IN (STANDBY)
+12V OUT
GROUND
F101 2A
C116 22μF 25V
BI102
GROUND
Hs IN
Vs IN
+6V OUT
+3.3V IN
TARGET VOLTAGE OUT
LOW LIGHT INDICATOR DC IN
H. SAWTOOTH OUT
H. PARABOLA OUT
V. PARABOLA OUT
V. SAWTOOTH OUT
WHITE BALANCE DC IN
+9V OUT
GROUND
R192 47
R104 3.3K
AUDIO AMPLIFIER
BR101 (R1011~R1019)
IC101(1/2) AUDIO AMP
R102 5.6K
R101 12K
C101 1μF 50V
R103 6.8K
C102 220μF 10V
R1011 680
C103 47μF 6.3V
C104 0.22μF 50V
C105 150PF
C106 0.22μF 50V
R1015 470K
R1017 150
R194 620
AUDIO IN
AUDIO OUT
+9V
H. SAW
H. PARA
V. PARA
V. SAW
STANDBY
REC INDICATOR INHIBIT
HORIZONTAL SAWTOOTH/PARABOLA GENERATOR
Q101 SWITCHING AMP
IC101(1/2) H.SAWTOOTH GENERATOR
IC102(1/2) H.PARABOLA GENERATOR
BR102(R1021~R1026)
VR101 H.PARABOLA
VR102 H.SAWTOOTH
DARK SHADING CORRECTION AN
IC102(1/2) MIX AMP
Q102 BL GENER
+3.3V
C117 10μF 10V
D102
R146 56K
R147 56K
R118 22K
Q126
Q106
R117 220
CL101
C119 4.7μF 25V
VR107 3.3K
R121 560
C123 0.033μF
C122 0.1μF
VR108 22K
VR107 CONTRAST
VR108 +9V ADJ.
IC103
VIDEO AMP
VOLTAGE REGULATOR
VTR START STOP
SYNC SEPARATION
FADE CONTROL
V. OSC
R120 39K
D103
C121 0.0056μF
C124 680PF
C120 4.7μF 10V
R119 100K
Q116
C118 220μF 10V
Q116 REC INDICATOR CONTROL
BR104(R1041~R1047)
Q109
Q108
R188 56K
R200 56K
R186 5.6K
C125 10μF 16V
R197 150K
Q108, 109 REC INHIBIT
R196 22K
R199 5.6K
Q107
R198 3.3K
Q107 STANDBY CONTROL
L101 8.2μH
TP104
R123 5.6K
R122 11K
R124 2.2
IC104(1/2)
IC104(1/2) +6V DC REGULATOR
+6V/+4.5
Hs
Vs
+6V
TARGET VOLTAGE
REC INDICATOR DC
SYNC
VIDEO
WHITE BALANCE INDICATOR
BR106 (R1061~R1065)
R1065 22K
R1064 22K
R1061 4.7K
R1062 1M
R1063 10K
C172 0.01μF
IC109(1/2)
IC109 COMPARATOR
EVF VERTICAL DEFLECTION
IC107
R156 1.5K
C152 0.01μF
C150 10μF 16V
R155 4.7K
C151 10μF 16V
R154 82K
R157 68K
C153 470μF 6.3V
R158 2.7
VR115 100
C175 0.082μF
VR115 EVF V.SIZE
IC107 EVF VERTICAL DEFLECTION DRIVE
EVF HORIZONTAL DEFLECTION
IC108
PHASE COMPARATOR
H.OSC
H DRIVER
R162 3.3K
C155 10μF 16V
C156 0.018μF
C157 0.015μF
C158 0.027μF
R163 4.7K
C180 4.7μF 25V
R164 240
R165 2.7K
R167 2.4K
VR116 2.2K
C159 0.01μF
VR116 H.HOLD
R166 820
C161 100μF 10V
C160 47μF 6.3V
VR117 100
Q119
D105
D106
Q119 EVF HORIZONTAL DEFLECTION DRIVE
VR117 EVF H.SIZE
H. PARA
LOW LIGHT INDICATOR DC
YWV3030ZK99
DEFLECTION CIRCUIT BOARD
CN106
VERTICAL
HORIZONTAL
CRT DEFLECTION COIL L002
1
2
3
A
B
C

### PRODUCT SAFETY NOTE

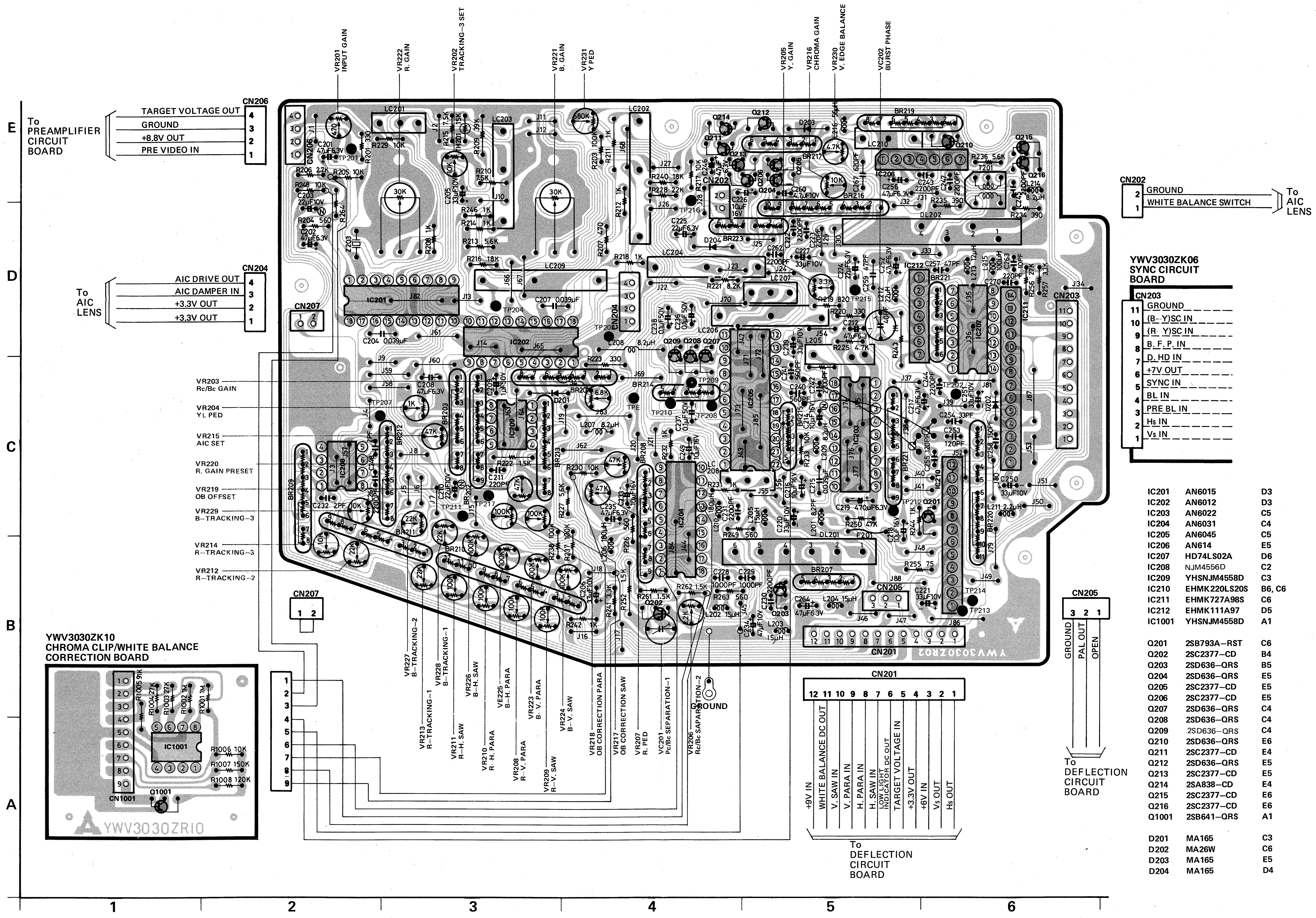
The shaded area on this schematic incorporates special features important for protection from X-radiation, fire and electrical shock hazards.
When servicing, it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

# F DEFLECTION CIRCUIT BOARD (YWV3030ZK99)

| | | |
|---|---|---|
| IC101 | YHSNJM4558D | C2, C3 |
| IC102 | NJM4560D | C3, C4 |
| IC103 | AN6055 | B2, B3 |
| IC104 | NJM4556D | B4 |
| IC105 | NJM4556DT | B5, B6 |
| IC106 | YHSNJM4558D | C5 |
| IC107 | AN374P | A3 |
| IC108 | AN5750 | A3, A4 |
| IC109 | AN6914 | A2 |
| | | |
| Q101 | 2SC2377–CD | C3 |
| Q102 | 2SC2377–CD | C4 |
| Q103 | 2SA749A | C4 |
| Q104 | 2SA749A | C4 |
| Q105 | 2SC1980–RST | C5 |
| Q106 | 2SD636–QRS | B2 |
| Q107 | 2SB641–QRS | B3 |
| Q108 | 2SD636–QRS | B3 |
| Q109 | 2SB641–QRS | B3 |
| Q110 | 2SD638–QR | B4 |
| Q111 | 2SD975 | B5 |
| Q112 | 2SD638–QR | B6 |
| Q113 | 2SB641–QRS | B6 |
| Q114 | 2SD636–QRS | B6 |
| Q115 | 2SC1473NC–QRS | C6 |
| Q116 | 2SD661–TU | B3 |
| Q117 | 2SB641–QRS | A4 |
| Q118 | 2SD636–QRS | B6 |
| Q119 | 2SD975 | A4 |
| Q120 | 2SC2377–CD | A4 |
| Q121 | 2SA838–CD | A4 |
| Q122 | 2SA749A | A5 |
| Q123 | 2SD638–QR | A5 |
| Q124 | 2SC1980–RST | A6 |
| Q126 | 2SD636–QRS | B2 |
| | | |
| D101 | MA165 | C4 |
| D102 | MA165 | B2 |
| D103 | MA165 | B3 |
| D104 | MA165 | B5 |
| D105 | MA165 | A4 |
| D106 | YUDRU2M | A4 |
| D107 | MA165 | A4 |
| D108 | MA165 | A5 |
| D109 | MA165 | C4 |
| D301 | LN217RP | A1 |
| D401 | LN23SRP,D | A7 |
| D402 | LN43SYP | A7 |

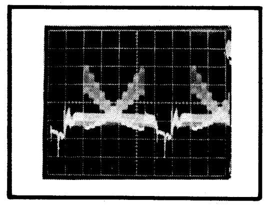

DARK SHADING CORRECTION AND CATHODE BLANKING
DYNAMIC FOCUS CORRECTION
VERTICAL SAWTOOTH/PARABOLA GENERATOR
TARGET VOLTAGE CONTROL
IC102(1/2) MIX AMP
Q102 BL GENERATOR
Q103 BL MIX
Q104 BUFFER
Q105 AMP
Q115 DC AMP
IC106(1/2) V.SAWTOOTH GENERATOR
IC106(1/2) V.PARABOLA GENERATOR
VR102 H.SAWTOOTH
VR103 H.SAWTOOTH
VR104 H.PARABOLA
VR105 V.PARABOLA
VR106 V.SAWTOOTH
VR114 TARGET
TP101
TP103
TP104
TP105
TP106
TP107
TP108
+6V/+4.5V DC REGULATOR
CAMERA HORIZONTAL DEFLECTION
HORIZONTAL LINEARITY CORRECTION
CAMERA VERTICAL DEFLECTION
TARGET PROTECTION
Q113 PLAYBACK DETECTOR
Q114, Q118 TARGET PROTECTION
Q107 STANDBY CONTROL
IC104(1/2) +6V DC REGULATOR
IC104(1/2) +4.5V DC REGULATOR
Q110 INVERTER
Q111 H.DEFLECTION AMP
IC105(1/2) H.DEFFERENTIAL AMP
IC105(1/2) V.DIFFERENTIAL AMP
Q112 V.SAWTOOTH GENERATOR
VR109 CAMERA H.SIZE
VR110 CAMERA H.LIN
VR111 H.CENTERING
VR112 CAMERA V.SIZE
VR113 V.CENTERING
L001 VIDICON DEFLECTION COIL
CN107
THERMISTOR
V.DEF OUT(–)
V.DEF OUT(+)
H.DEF OUT(–)
H.DEF OUT(+)
VERTICAL
HORIZONTAL
CRT BLANKING
HIGH VOLTAGE
T102 HIGH VOLTAGE PACK
DRIVER
STEP-UP TRANSFORMER
RECTIFIERS
BR107(R1071~R1074)
BI105
G3 DC OUT
G2 DC OUT
G1 DC OUT
+9V OUT
+6V OUT
CN004
CRT001 CATHODE RAY TUBE
CRT SOCKET
OSC
H DRIVER
Q119 EVF HORIZONTAL DEFLECTION DRIVE
VR117 EVF H.SIZE
Q120, Q121 BUFFER
Q117 BLANKING MIXING
Q122 CRT SPOT ELIMINATOR
Q123 INVERTER
VR118 BEAM
VR121 BRIGHTNESS
VR119 EVF FOCUS
VR120 CAMERA FOCUS
Q124 VIDEO AMP
REC INDICATOR
LOW LIGHT INDICATOR
BI104
H.PARABOLA OUT
REC INDICATOR DC OUT
LOW LIGHT INDICATOR DC OUT
D401 Red
D402 Amber
YWV3000EZK4 LED CIRCUIT BOARD
BI103
G2
G4
H(GROUND)
K
G1
H
TO VIDICON SOCKET
TARGET VOLTAGE
DARK SHADING/BL
DYNAMIC FOCUS
V.SAW
V.PARA
H.SAW
H.PARA
H.FLYBACK PULSE
H.DEF OUT
V.DEF OUT
REC INDICATOR DC
VIDEO
EVF VIDEO
LOW LIGHT INDICATOR DC
4
5
6
7

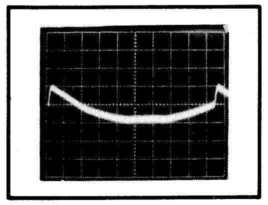
# CONDUCTOR VIEW OF PROCESS CIRCUIT BOARD (YWV3030ZK02)

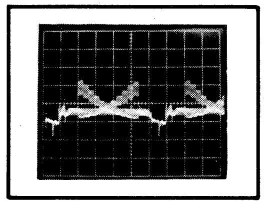

VR201 INPUT GAIN
VR222 R. GAIN
VR202 TRACKING-3 SET
VR221 B. GAIN
VR231 Y PED
VR205 Y. GAIN
VR216 CHROMA GAIN
VR230 V. EDGE BALANCE
VC202 BURST PHASE
CN206
To PREAMPLIFIER CIRCUIT BOARD
TARGET VOLTAGE OUT 4
GROUND 3
+8.8V OUT 2
PRE VIDEO IN 1
CN204
To AIC LENS
AIC DRIVE OUT 4
AIC DAMPER IN 3
+3.3V OUT 2
+3.3V OUT 1
CN207
CN202
2 GROUND
1 WHITE BALANCE SWITCH
To AIC LENS
YWV3030ZK06 SYNC CIRCUIT BOARD
CN203
11 GROUND
10 (B-Y)SC IN
9 (R-Y)SC IN
8 B. F. P. IN
7 D. HD IN
6 +7V OUT
5 SYNC IN
4 BL IN
3 PRE BL IN
2 Hs IN
1 Vs IN
VR203 Rc/Bc GAIN
VR204 YL PED
VR215 AIC SET
VR220 R. GAIN PRESET
VR219 OB OFFSET
VR229 B-TRACKING-3
VR214 R-TRACKING-3
VR212 R-TRACKING-2
VR227 B-TRACKING-2
VR213 R-TRACKING-1
VR228 B-TRACKING-1
VR211 R-H. SAW
VR226 B-H. SAW
VR210 R-H. PARA
VE225 B-H. PARA
VR208 R-V. PARA
VR223 B-V. PARA
VR209 R-V. SAW
VR224 B-V. SAW
VR218 OB CORRECTION PARA
VR217 OB CORRECTION SAW
VR207 R. PED
VC201 Pc/Bc SEPARATION-1
VR206 Rc/Bc SAPARATION-2
GROUND
CN201
12 11 10 9 8 7 6 5 4 3 2 1
+9V IN
WHITE BALANCE DC OUT
V. SAW IN
V. PARA IN
H. PARA IN
H. SAW IN
LOW LIGHT INDICATOR DC OUT
TARGET VOLTAGE IN
+3.3V OUT
+6V IN
Vs OUT
Hs OUT
To DEFLECTION CIRCUIT BOARD
CN205
3 2 1
GROUND
PAL OUT
OPEN
To DEFLECTION CIRCUIT BOARD
YWV3030ZK10 CHROMA CLIP/WHITE BALANCE CORRECTION BOARD
CN1001
IC1001
Q1001
R1001 1M
R1002 1M
R1003 27K
R1004 27K
R1005 91K
R1006 10K
R1007 150K
R1008 120K
YWV3030ZR10
YWV3030ZR02
IC201
IC202
IC203
IC204
IC205
IC206
IC207
IC208
IC209
IC210
IC211
IC212
E
D
C
B
A
1
2
3
4
5
6

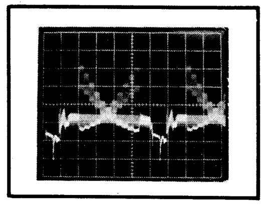
| | | |
|---|---|---|
| IC201 | AN6015 | D3 |
| IC202 | AN6012 | D3 |
| IC203 | AN6022 | C5 |
| IC204 | AN6031 | C4 |
| IC205 | AN6045 | C5 |
| IC206 | AN614 | E5 |
| IC207 | HD74LS02A | D6 |
| IC208 | NJM4556D | C2 |
| IC209 | YHSNJM4558D | C3 |
| IC210 | EHMK220LS20S | B6, C6 |
| IC211 | EHMK727A98S | C6 |
| IC212 | EHMK111A97 | D5 |
| IC1001 | YHSNJM4558D | A1 |
| Q201 | 2SB793A–RST | C6 |
| Q202 | 2SC2377–CD | B4 |
| Q203 | 2SD636–QRS | B5 |
| Q204 | 2SD636–QRS | E5 |
| Q205 | 2SC2377–CD | E5 |
| Q206 | 2SC2377–CD | E5 |
| Q207 | 2SD636–QRS | C4 |
| Q208 | 2SD636–QRS | C4 |
| Q209 | 2SD636–QRS | C4 |
| Q210 | 2SD636–QRS | E6 |
| Q211 | 2SC2377–CD | E4 |
| Q212 | 2SD636–QRS | E5 |
| Q213 | 2SC2377–CD | E5 |
| Q214 | 2SA838–CD | E4 |
| Q215 | 2SC2377–CD | E6 |
| Q216 | 2SC2377–CD | E6 |
| Q1001 | 2SB641–QRS | A1 |
| D201 | MA165 | C3 |
| D202 | MA26W | C6 |
| D203 | MA165 | E5 |
| D204 | MA165 | D4 |

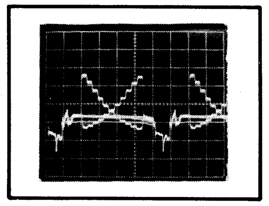
# SIGNAL WAVEFORMS OF PROCESS CIRCUIT BOARD

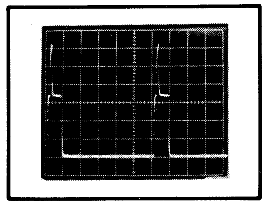

2-1 0.2V/DIV,10μs/DIV

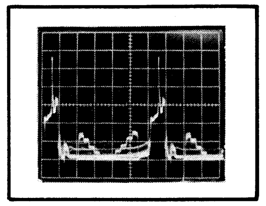

2-2 0.02V/DIV,2ms/DIV

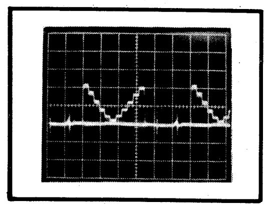

2-3 0.2V/DIV,10μs/DIV

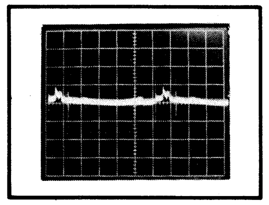

2-4 0.2V/DIV,10μs/DIV

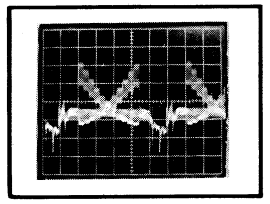

2-5 0.2V/DIV,10μs/DIV

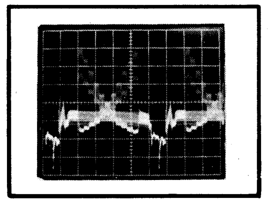

2-6 1V/DIV,10μs/DIV

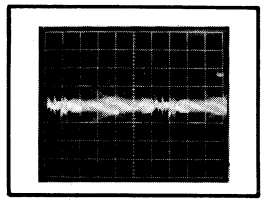

2-7 0.2V/DIV,10μs/DIV

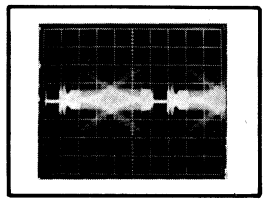

2-8 0.2V/DIV,10μs/DIV

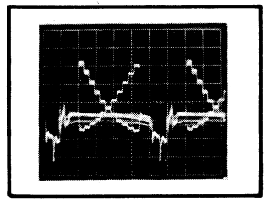

2-9 0.5V/DIV, 10μs/DIV

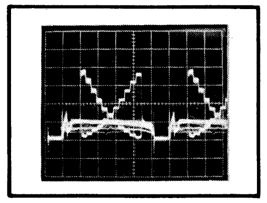

2-10 0.1V/DIV,10μs/DIV

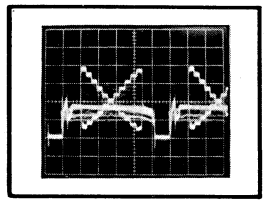

2-11 0.2V/DIV,10μs/DIV

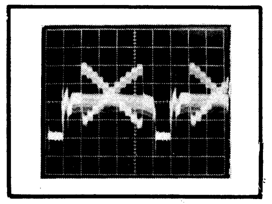

2-12 0.02V/DIV,10μs/DIV

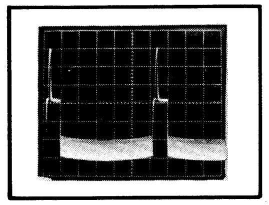

2-13 0.2V/DIV,10μs/DIV

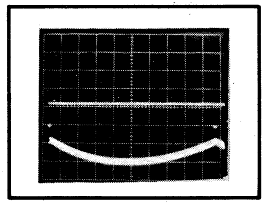

2-14 0.2V/DIV,10μs/DIV

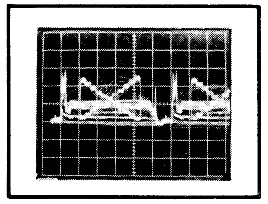

2-15 0.2V/DIV,10μs/DIV

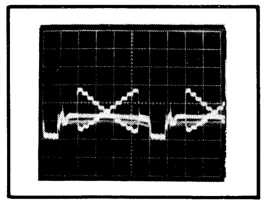

2-16 0.1V/DIV,10μs/DIV

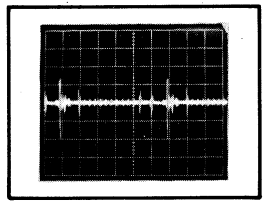

2-17 0.05V/DIV,10μs/DIV

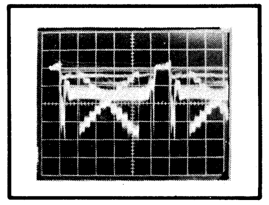

2-18 1V/DIV,10μs/DIV

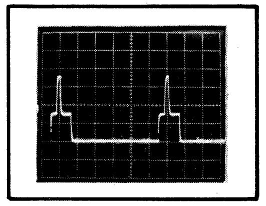

2-18 1V/DIV,2ms/DIV

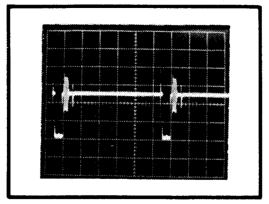

2-19 0.05V/DIV,10μs/DIV

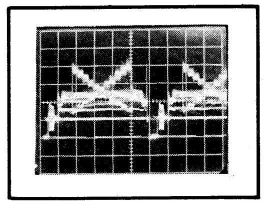

2-20 0.05V/DIV,10μs/DIV

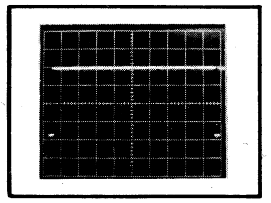

2-21 0.5V/DIV,10μs/DIV

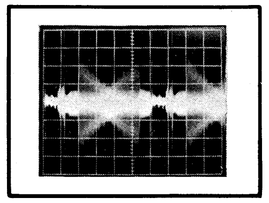

2-22 0.2V/DIV,10μs/DIV


2-23 2V/DIV,10μs/DIV


2-24 0.1V/DIV,10μs/DIV

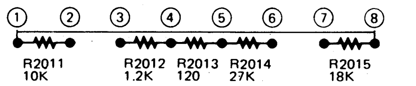

2-25 0.5V/DIV,10μs/DIV


2-26 1V/DIV,2ms/DIV

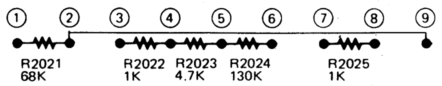

2-27 0.02V/DIV,10μs/DIV

# INTERNAL CONNECTION OF BLOCK RESISTORS

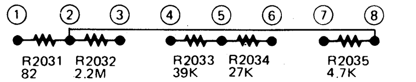
**BR201**
**EXBH85146JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧
R2011 10K
R2012 1.2K
R2013 120
R2014 27K
R2015 18K

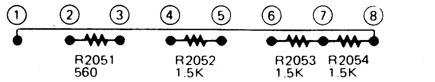
**BR202**
**EXBH85217JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
R2021 68K
R2022 1K
R2023 4.7K
R2024 130K
R2025 1K

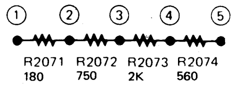
**BR203**
**EXBH85218SB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧
R2031 82
R2032 2.2M
R2033 39K
R2034 27K
R2035 4.7K

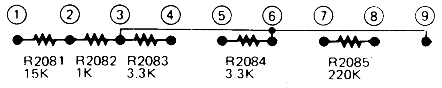
**BR205**
**EXBH84155JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧
R2051 560
R2052 1.5K
R2053 1.5K
R2054 1.5K

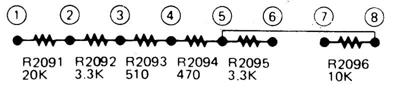
**BR207**
**EXBH84194JB**


① ② ③ ④ ⑤
R2071 180
R2072 750
R2073 2K
R2074 560

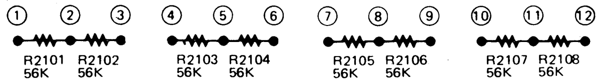
**BR208**
**EXBH85145JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
R2081 15K
R2082 1K
R2083 3.3K
R2084 3.3K
R2085 220K

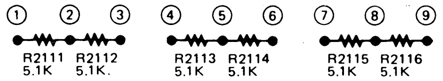
**BR209**
**EXBH86126JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧
R2091 20K
R2092 3.3K
R2093 510
R2094 470
R2095 3.3K
R2096 10K

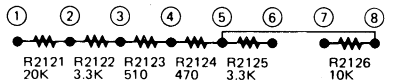
**BR210**
**EXBH88117KB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫
R2101 56K
R2102 56K
R2103 56K
R2104 56K
R2105 56K
R2106 56K
R2107 56K
R2108 56K

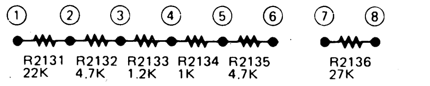
**BR211**
**EXBH86118KB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
R2111 5.1K
R2112 5.1K.
R2113 5.1K
R2114 5.1K
R2115 5.1K
R2116 5.1K

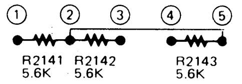
**BR212**
**EXBH86126JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧
R2121 20K
R2122 3.3K
R2123 510
R2124 470
R2125 3.3K
R2126 10K

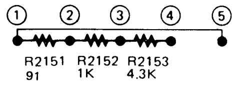
**BR213**
**EXBH86128JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧
R2131 22K
R2132 4.7K
R2133 1.2K
R2134 1K
R2135 4.7K
R2136 27K

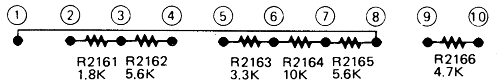
**BR214**
**EXBH83141JB**


① ② ③ ④ ⑤
R2141 5.6K
R2142 5.6K
R2143 5.6K

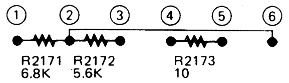
**BR215**
**EXBH83139JB**


① ② ③ ④ ⑤
R2151 91
R2152 1K
R2153 4.3K

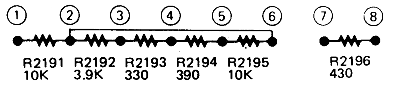
**BR216**
**EXBH86198JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩
R2161 1.8K
R2162 5.6K
R2163 3.3K
R2164 10K
R2165 5.6K
R2166 4.7K

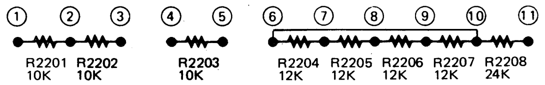
**BR217**
**EXBH84130SB**


① ② ③ ④ ⑤ ⑥
R2171 6.8K
R2172 5.6K
R2173 10

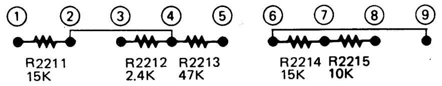
**BR219**
**EXBH86127JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧
R2191 10K
R2192 3.9K
R2193 330
R2194 390
R2195 10K
R2196 430

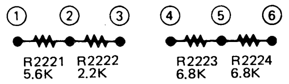
**BR220**
**EXBH88171JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪
R2201 10K
R2202 10K
R2203 10K
R2204 12K
R2205 12K
R2206 12K
R2207 12K
R2208 24K

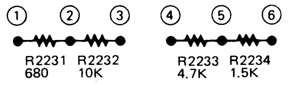
**BR221**
**EXBH85199JB**


① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
R2211 15K
R2212 2.4K
R2213 47K
R2214 15K
R2215 10K

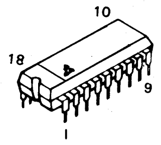
**BR222**
**EXBH84174JB**


① ② ③ ④ ⑤ ⑥
R2221 5.6K
R2222 2.2K
R2223 6.8K
R2224 6.8K

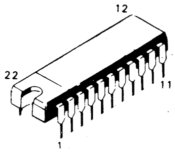
**BR223**
**EXBH84170JB**


① ② ③ ④ ⑤ ⑥
R2231 680
R2232 10K
R2233 4.7K
R2234 1.5K

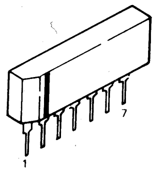
AN6012
AN6015
AN6022
AN6031



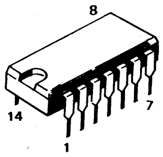
AN6045



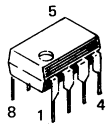
AN614



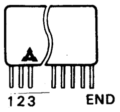
HD74LS02A



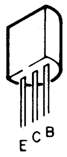
NJM4556D
YHSNJM4558D



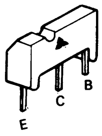
EHMK111A97
EHMK220LS20
EHMK727A98S



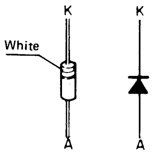
2SA838-CD



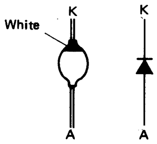
2SB793-RST
2SC2377-CD
2SD636-QRS



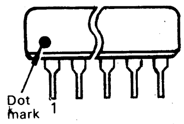
MA165



MA26W

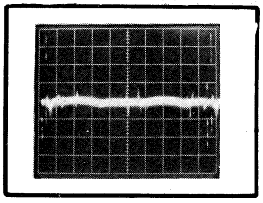


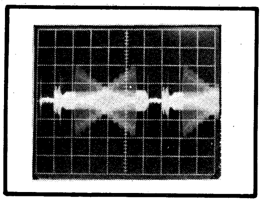
BLOCK RESISTOR

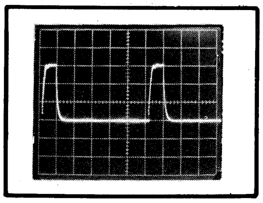


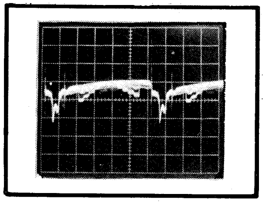
(Dot indicates pin No. 1 side)

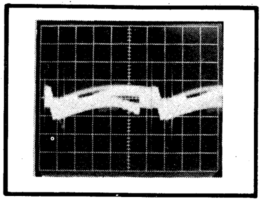
# SIGNAL WAVEFORMS OF PROCESS CIRCUIT BOARD

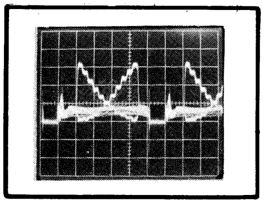

2-28 0.02V/DIV,2ms/DIV

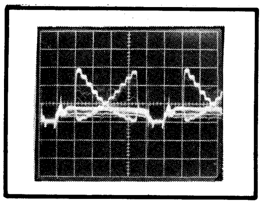

2-29 0.05V/DIV,10μs/DIV

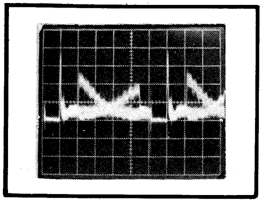

2-30 2V/DIV,10μs/DIV

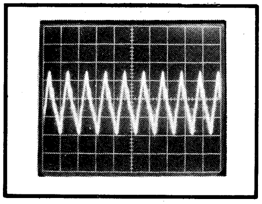

2-31 0.1V/DIV,10μs/DIV

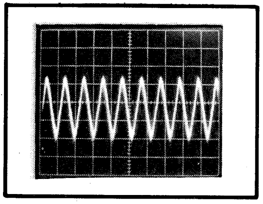

2-32 0.05V/DIV,10μs/DIV

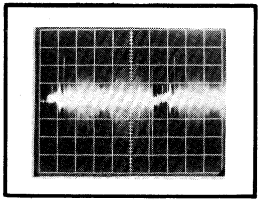

2-33 0.2V/DIV,10μs/DIV

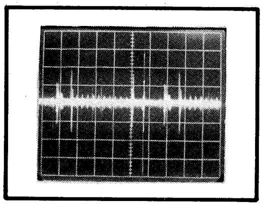

2-34 0.2V/DIV,10μs/DIV

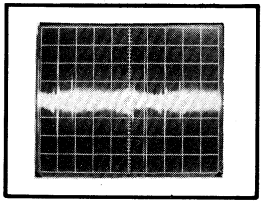

2-35 0.2V/DIV,10μs/DIV

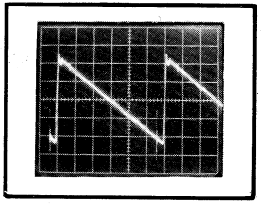

2-36 0.05V/DIV,0.2μs/DIV

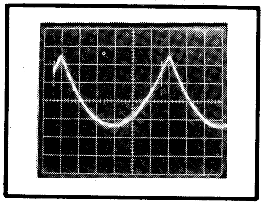

2-37 0.05V/DIV,0.2μs/DIV

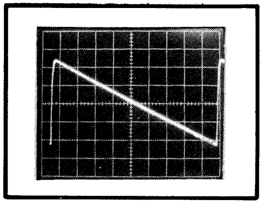

2-38 0.1V/DIV,10μs/DIV

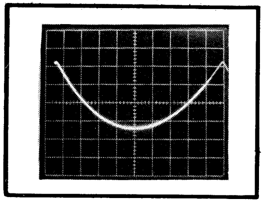

2-39 0.1V/DIV,10μs/DIV

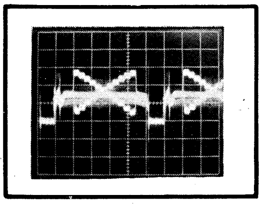

2-40 0.02V/DIV,10μs/DIV

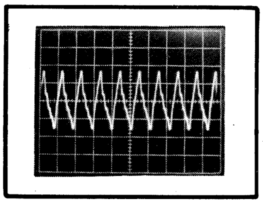

2-41 0.5V/DIV,10μs/DIV

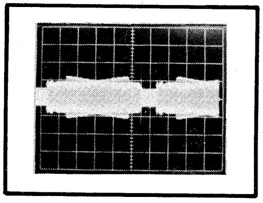

2-42 0.5V/DIV,10μs/DIV

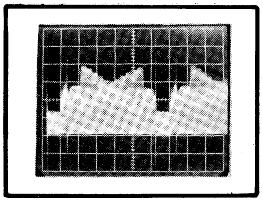

2-43 0.5V/DIV,2ms/DIV

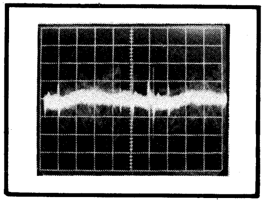

2-44 0.5V/DIV,2ms/DIV

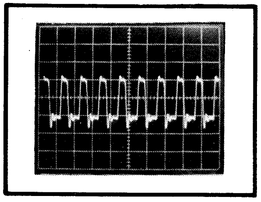

2-45 0.05V/DIV,10μs/DIV

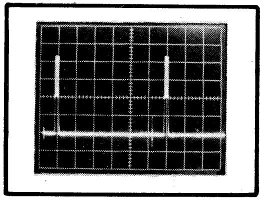

2-46 0.1V/DIV,0.2μs/DIV

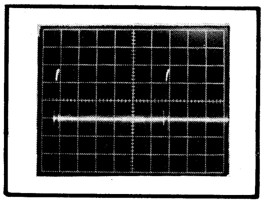

2-47 0.5V/DIV,10μs/DIV

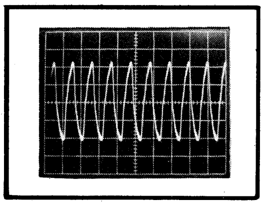

2-48 0.05V/DIV,10μs/DIV

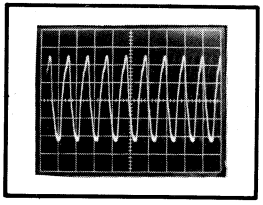

2-49 0.05V/DIV,10μs/DIV

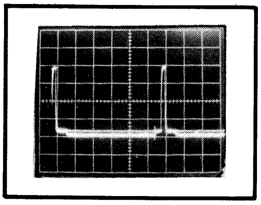

2-50 2V/DIV,0.02μs/DIV

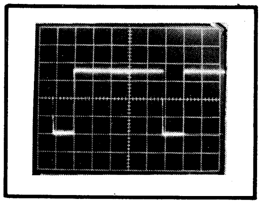

2-51 0.5V/DIV,10μs/DIV

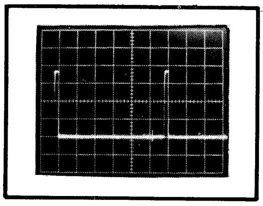

2-52 2V/DIV,10μs/DIV

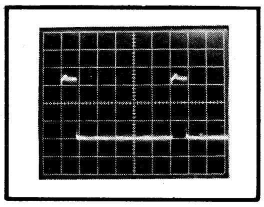

2-53 0.5V/DIV,0.2μs/DIV

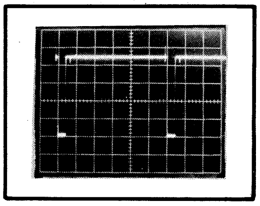

2-54 0.5V/DIV,0.2μs/DIV

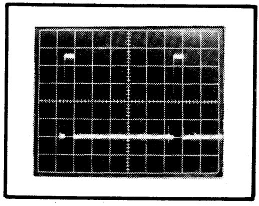

2-55 2V/DIV,10μs/DIV


2-56 2V/DIV,10μs/DIV

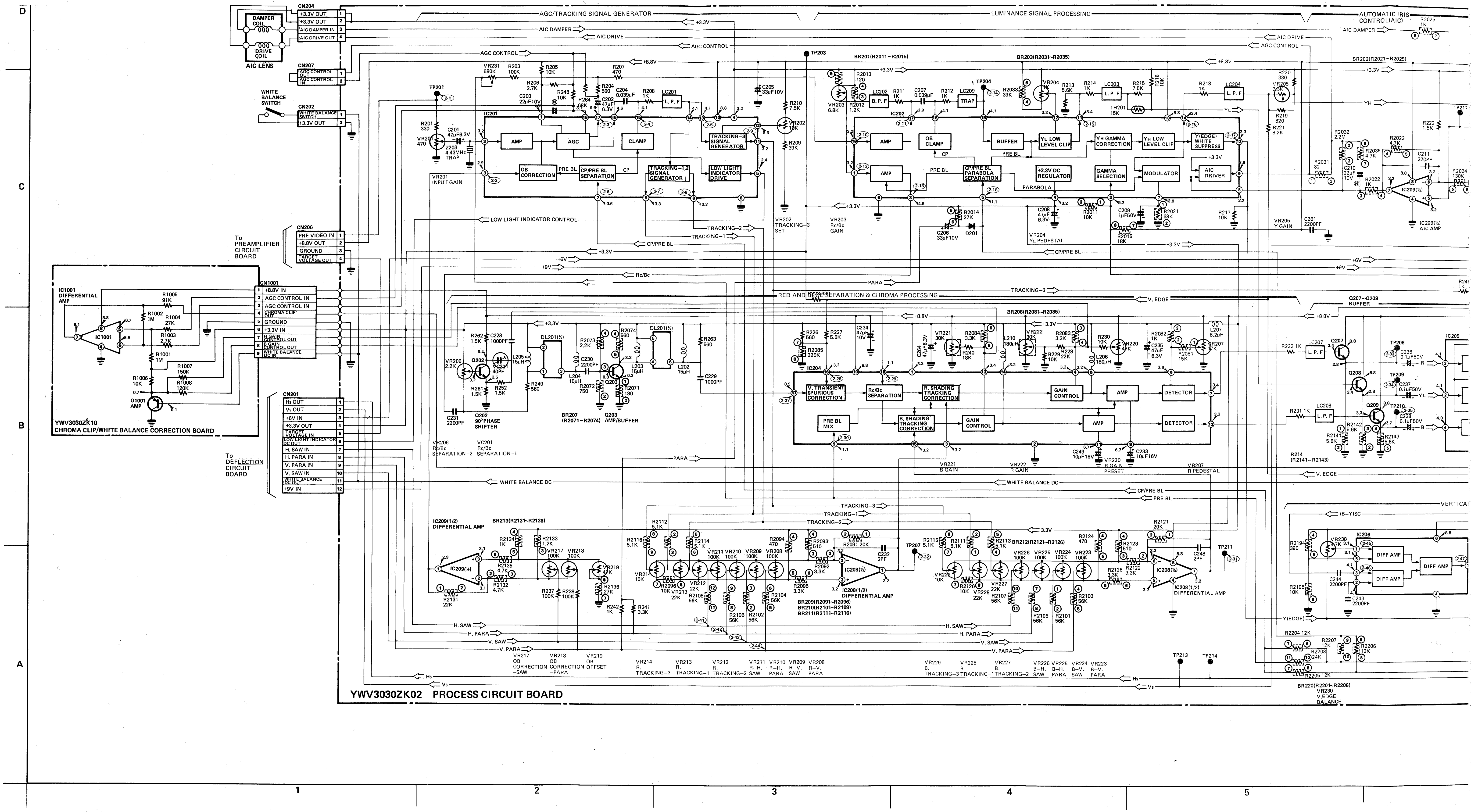

2-57 2V/DIV,10μs/DIV


2-58 2V/DIV,10μs/DIV


2-59 1V/DIV,10μs/DIV


2-60 1V/DIV,10μs/DIV

# SCHEMATIC DIAGRAM OF PROCESS CIRCUIT

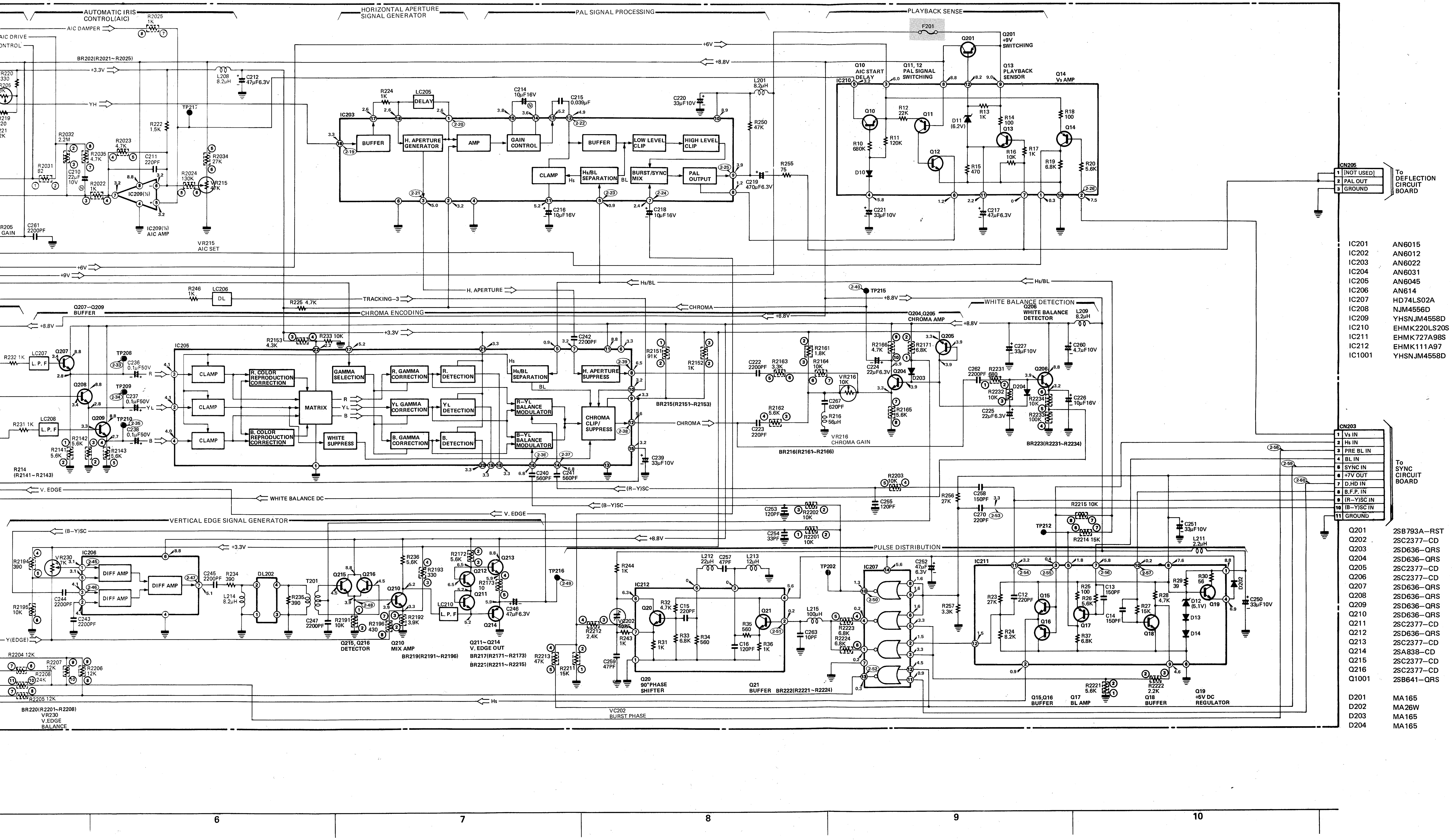


D
C
B
A
1
2
3
4
5
AIC LENS
DAMPER COIL
DRIVE COIL
CN204
+3.3V OUT
+3.3V OUT
AIC DAMPER IN
AIC DRIVE OUT
CN207
AGC CONTROL OUT
AGC CONTROL IN
WHITE BALANCE SWITCH
CN202
WHITE BALANCE SWITCH
+3.3V OUT
To PREAMPLIFIER CIRCUIT BOARD
CN206
PRE VIDEO IN
+8.8V OUT
GROUND
TARGET VOLTAGE OUT
CN1001
+8.8V IN
AGC CONTROL IN
AGC CONTROL IN
CHROMA CLIP OUT
GROUND
+3.3V IN
R GAIN CONTROL OUT
B GAIN CONTROL OUT
WHITE BALANCE DC IN
IC1001 DIFFERENTIAL AMP
Q1001 AMP
YWV3030ZK10
CHROMA CLIP/WHITE BALANCE CORRECTION BOARD
To DEFLECTION CIRCUIT BOARD
CN201
Hs OUT
Vs OUT
+6V IN
+3.3V OUT
TARGET VOLTAGE IN
LOW LIGHT INDICATOR DC OUT
H. SAW IN
H. PARA IN
V. PARA IN
V. SAW IN
WHITE BALANCE DC OUT
+9V IN
AGC/TRACKING SIGNAL GENERATOR
LUMINANCE SIGNAL PROCESSING
AUTOMATIC IRIS CONTROL(AIC)
IC201
AMP
AGC
CLAMP
TRACKING–3 SIGNAL GENERATOR
OB CORRECTION
CP/PRE BL SEPARATION
TRACKING–1,2 SIGNAL GENERATOR
LOW LIGHT INDICATOR DRIVE
VR201 INPUT GAIN
VR202 TRACKING–3 SET
VR203 Rc/Bc GAIN
LOW LIGHT INDICATOR CONTROL
BR201(R2011~R2015)
BR203(R2031~R2035)
BR202(R2021~R2025)
IC202
B. P. F
TRAP
OB CLAMP
BUFFER
YL LOW LEVEL CLIP
YH GAMMA CORRECTION
YH LOW LEVEL CLIP
Y(EDGE) WHITE SUPPRESS
CP/PRE BL PARABOLA SEPARATION
+3.3V DC REGULATOR
GAMMA SELECTION
MODULATOR
AIC DRIVER
IC209(½) AIC AMP
VR204 YL PEDESTAL
VR205 Y GAIN
RED AND BLUE SEPARATION & CHROMA PROCESSING
BR208(R2081~R2085)
IC204
V. TRANSIENT SPURIOUS CORRECTION
Rc/Bc SEPARATION
R. SHADING TRACKING CORRECTION
B. SHADING TRACKING CORRECTION
PRE BL MIX
GAIN CONTROL
AMP
DETECTOR
VR221 B GAIN
VR222 R GAIN
VR220 R GAIN PRESET
VR207 R PEDESTAL
Q202 90° PHASE SHIFTER
BR207 (R2071~R2074)
Q203 AMP/BUFFER
VR206 Rc/Bc SEPARATION–2
VC201 Rc/Bc SEPARATION–1
DL201(½)
Q207~Q209 BUFFER
R214 (R2141~R2143)
IC205
WHITE BALANCE DC
CP/PRE BL
PRE BL
V. EDGE
IC209(1/2) DIFFERENTIAL AMP
BR213(R2131~R2136)
BR209(R2091~R2096)
BR210(R2101~R2108)
BR211(R2111~R2116)
IC208(1/2) DIFFERENTIAL AMP
BR212(R2121~R2126)
TRACKING–1
TRACKING–2
TRACKING–3
H. SAW
H. PARA
V. SAW
V. PARA
Hs
Vs
VR217 OB CORRECTION –SAW
VR218 OB CORRECTION –PARA
VR219 OB OFFSET
VR214 R. TRACKING–3
VR213 R. TRACKING–1
VR212 R. TRACKING–2
VR211 R–H. SAW
VR210 R–H. PARA
VR209 R–V. SAW
VR208 R–V. PARA
VR229 B. TRACKING–3
VR228 B. TRACKING–1
VR227 B. TRACKING–2
VR226 B–H. SAW
VR225 B–H. PARA
VR224 B–V. SAW
VR223 B–V. PARA
TP201
TP203
TP204
TP207
TP208
TP209
TP210
TP211
TP213
TP214
VERTICAL
IC206
DIFF AMP
BR220(R2201~R2208)
VR230 V.EDGE BALANCE
YWV3030ZK02 PROCESS CIRCUIT BOARD

# PROCESS CIRCUIT BOARD (YWV3030ZK02)

## PRODUCT SAFETY NOTE

The shaded area on this schematic incorporates special features important for protection from X-radiation, fire and electrical shock hazards.
When servicing, it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

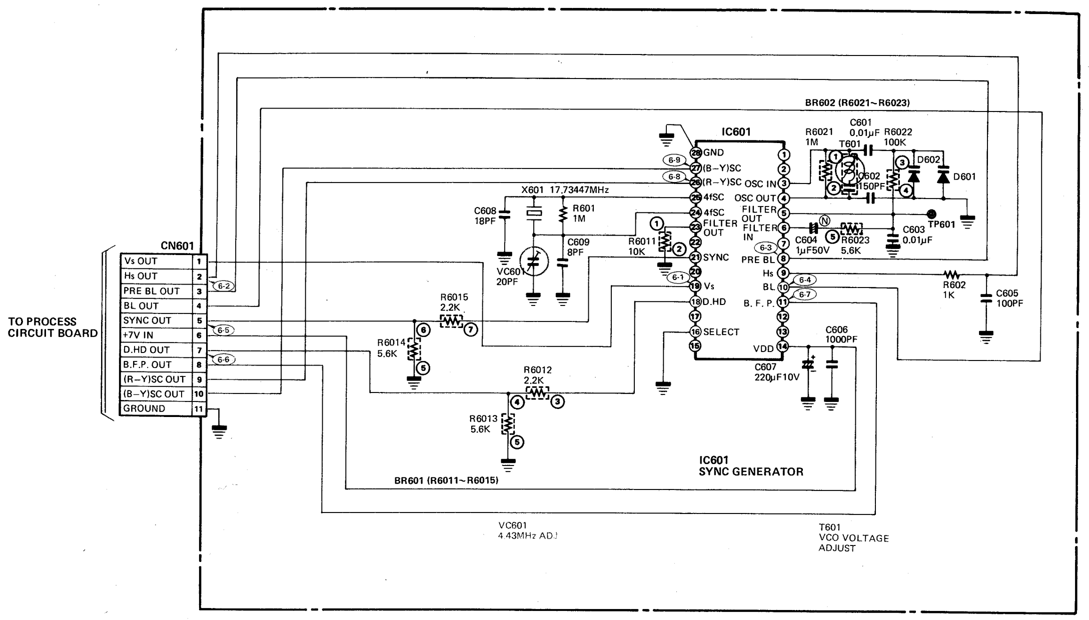

AUTOMATIC IRIS CONTROL(AIC)
AIC DAMPER
AIC DRIVE
CONTROL
BR202(R2021~R2025)
+3.3V
YH
IC209(½)
IC209(½) AIC AMP
VR215 AIC SET
+6V
+9V
HORIZONTAL APERTURE SIGNAL GENERATOR
PAL SIGNAL PROCESSING
IC203
BUFFER
H. APERTURE GENERATOR
AMP
GAIN CONTROL
BUFFER
LOW LEVEL CLIP
HIGH LEVEL CLIP
CLAMP
Hs/BL SEPARATION
BURST/SYNC MIX
PAL OUTPUT
+6V
+8.8V
PLAYBACK SENSE
F201
Q201 +9V SWITCHING
Q10 AIC START DELAY
Q11, 12 PAL SIGNAL SWITCHING
Q13 PLAYBACK SENSOR
Q14 Vs AMP
IC210
CN205
1 [NOT USED]
2 PAL OUT
3 GROUND
To DEFLECTION CIRCUIT BOARD
Q207~Q209 BUFFER
TRACKING-3
H. APERTURE
Hs/BL
CHROMA ENCODING
CHROMA
TP215
WHITE BALANCE DETECTION
Q204,Q205 CHROMA AMP
Q206 WHITE BALANCE DETECTOR
IC205
L. P. F
CLAMP
R. COLOR REPRODUCTION CORRECTION
B. COLOR REPRODUCTION CORRECTION
MATRIX
GAMMA SELECTION
WHITE SUPPRESS
R. GAMMA CORRECTION
YL GAMMA CORRECTION
B. GAMMA CORRECTION
R. DETECTION
YL DETECTION
B. DETECTION
Hs/BL SEPARATION
H. APERTURE SUPPRESS
R-YL BALANCE MODULATOR
B-YL BALANCE MODULATOR
CHROMA CLIP/ SUPPRESS
BR215(R2151~R2153)
VR216 CHROMA GAIN
BR216(R2161~R2166)
BR223(R2231~R2234)
CN203
1 Vs IN
2 Hs IN
3 PRE BL IN
4 BL IN
5 SYNC IN
6 +7V OUT
7 D.HD IN
8 B.F.P. IN
9 (R-Y)SC IN
10 (B-Y)SC IN
11 GROUND
To SYNC CIRCUIT BOARD
R214 (R2141~R2143)
V. EDGE
WHITE BALANCE DC
(R-Y)SC
(B-Y)SC
VERTICAL EDGE SIGNAL GENERATOR
(B-Y)SC
IC206
DIFF AMP
DIFF AMP
DIFF AMP
DL202
T201
Q215, Q216 DETECTOR
Q210 MIX AMP
BR219(R2191~R2196)
Q211~Q214 V. EDGE OUT
BR217(R2171~R2173)
BR221(R2211~R2215)
TP216
Y(EDGE)
BR220(R2201~R2208) VR230 V.EDGE BALANCE
+8.8V
PULSE DISTRIBUTION
IC212
Q20 90°PHASE SHIFTER
Q21 BUFFER BR222(R2221~R2224)
IC207
IC211
Q15,Q16 BUFFER
Q17 BL AMP
Q18 BUFFER
Q19 +5V DC REGULATOR
VC202 BURST PHASE
Hs
6
7
8
9
10

| | | |
|---|---|---|
| IC201 | AN6015 | C2, C3 |
| IC202 | AN6012 | C4, C5 |
| IC203 | AN6022 | C7, C8 |
| IC204 | AN6031 | B3, B4, B5 |
| IC205 | AN6045 | B6, B7, B8 |
| IC206 | AN614 | A6 |
| IC207 | HD74LS02A | A9 |
| IC208 | NJM4556D | A3, A5 |
| IC209 | YHSNJM4558D | A2, C6 |
| IC210 | EHMK220LS20S | C9, C10 |
| IC211 | EHMK727A98S | A9, A10 |
| IC212 | EHMK111A97 | A8 |
| IC1001 | YHSNJM4558D | B1 |

| | | |
|---|---|---|
| Q201 | 2SB793A–RST | D9 |
| Q202 | 2SC2377–CD | B2 |
| Q203 | 2SD636–QRS | B2 |
| Q204 | 2SD636–QRS | B9 |
| Q205 | 2SC2377–CD | B9 |
| Q206 | 2SC2377–CD | B9 |
| Q207 | 2SD636–QRS | B5 |
| Q208 | 2SD636–QRS | B6 |
| Q209 | 2SD636–QRS | B6 |
| Q210 | 2SD636–QRS | A7 |
| Q211 | 2SC2377–CD | A7 |
| Q212 | 2SD636–QRS | A7 |
| Q213 | 2SC2377–CD | A7 |
| Q214 | 2SA838–CD | A7 |
| Q215 | 2SC2377–CD | A7 |
| Q216 | 2SC2377–CD | A7 |
| Q1001 | 2SB641–QRS | B1 |

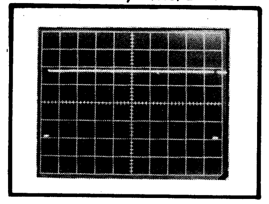
| | | |
|---|---|---|
| D201 | MA165 | C4 |
| D202 | MA26W | A10 |
| D203 | MA165 | B9 |
| D204 | MA165 | B9 |

# SCHEMATIC DIAGRAM OF SYNC CIRCUIT BOARD (YWV3030ZK06)

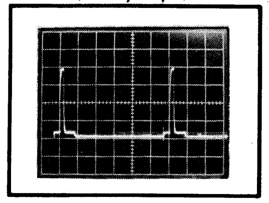

TO PROCESS CIRCUIT BOARD
CN601
Vs OUT 1
Hs OUT 2
PRE BL OUT 3
BL OUT 4
SYNC OUT 5
+7V IN 6
D.HD OUT 7
B.F.P. OUT 8
(R−Y)SC OUT 9
(B−Y)SC OUT 10
GROUND 11
6-2
6-5
6-6
X601 17.73447MHz
C608 18PF
R601 1M
C609 8PF
VC601 20PF
R6015 2.2K
R6014 5.6K
R6012 2.2K
R6013 5.6K
R6011 10K
BR601 (R6011~R6015)
BR602 (R6021~R6023)
IC601
GND
(B−Y)SC
(R−Y)SC
4fSC
4fSC
FILTER OUT
SYNC
Vs
D.HD
SELECT
OSC IN
OSC OUT
FILTER OUT
FILTER IN
PRE BL
Hs
BL
B. F. P.
VDD
6-9
6-8
6-1
6-3
6-4
6-7
R6021 1M
T601
C601 0.01μF
R6022 100K
C602 150PF
D602
D601
TP601
C604 1μF50V
R6023 5.6K
C603 0.01μF
R602 1K
C605 100PF
C606 1000PF
C607 220μF10V
IC601 SYNC GENERATOR
VC601 4.43MHz ADJ
T601 VCO VOLTAGE ADJUST

# SIGNAL WAVEFORMS OF SYNC CIRCUIT BOARD

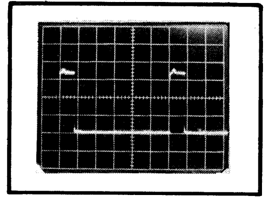
6-1 1V/DIV, 2ms/DIV



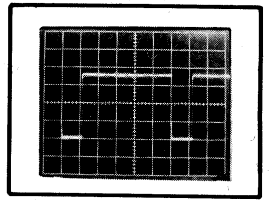
6-2 2V/DIV, 10μs/DIV



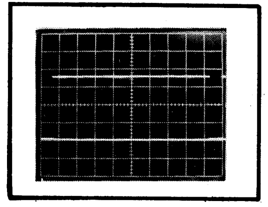
6-3 2V/DIV, 10μs/DIV



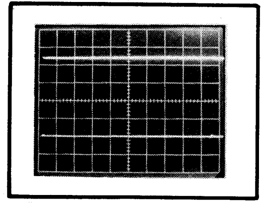
6-4 2V/DIV, 10μs/DIV



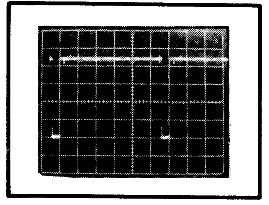
6-4 2V/DIV, 2ms/DIV



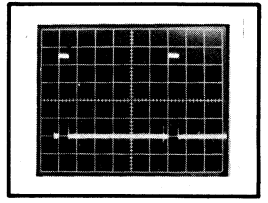
6-5 1V/DIV, 2ms/DIV



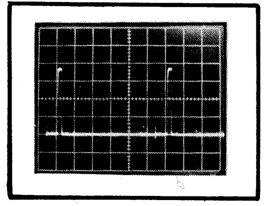
6-6 1V/DIV, 10μs/DIV



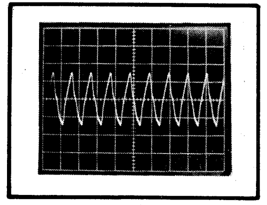
6-6 1V/DIV, 10μs/DIV



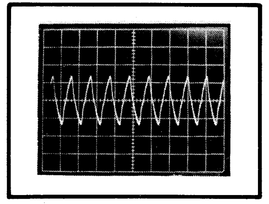
6-7 2V/DIV, 10μs/DIV



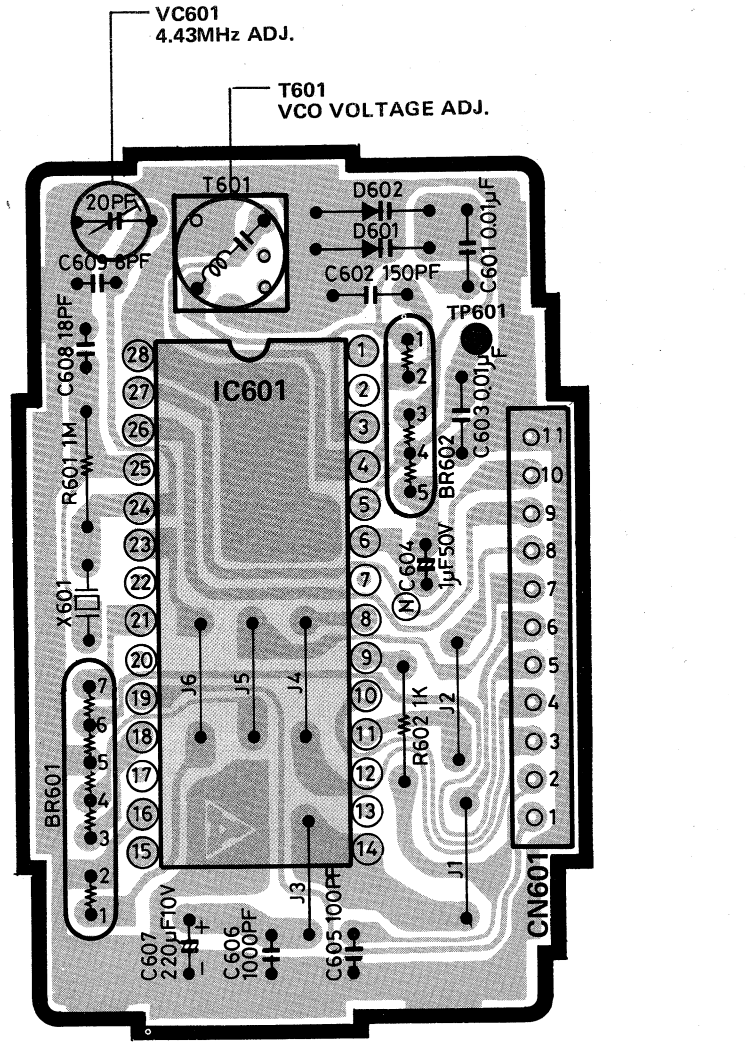
6-8 2V/DIV,0.2μs/DIV



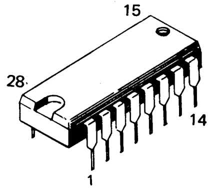
6-9 2V/DIV, 0.2μs/DIV



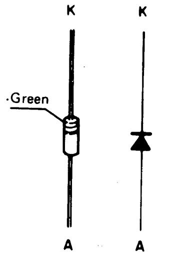
# CONDUCTOR VIEW OF SYNC CIRCUIT BOARD (YWV3030ZK06)


VC601
4.43MHz ADJ.
T601
VCO VOLTAGE ADJ.
20PF
T601
D602
D601
C609 8PF
C602 150PF
C601 0.01μF
TP601
C608 18PF
IC601
R601 1M
BR602
C603 0.01μF
X601
C604 1μF50V
BR601
J6
J5
J4
R602 1K
J2
J3
J1
C607 220μF10V
C606 1000PF
C605 100PF
CN601

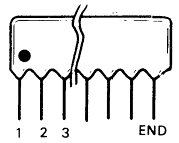
YWHD44007A

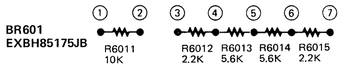


YUD1S2688

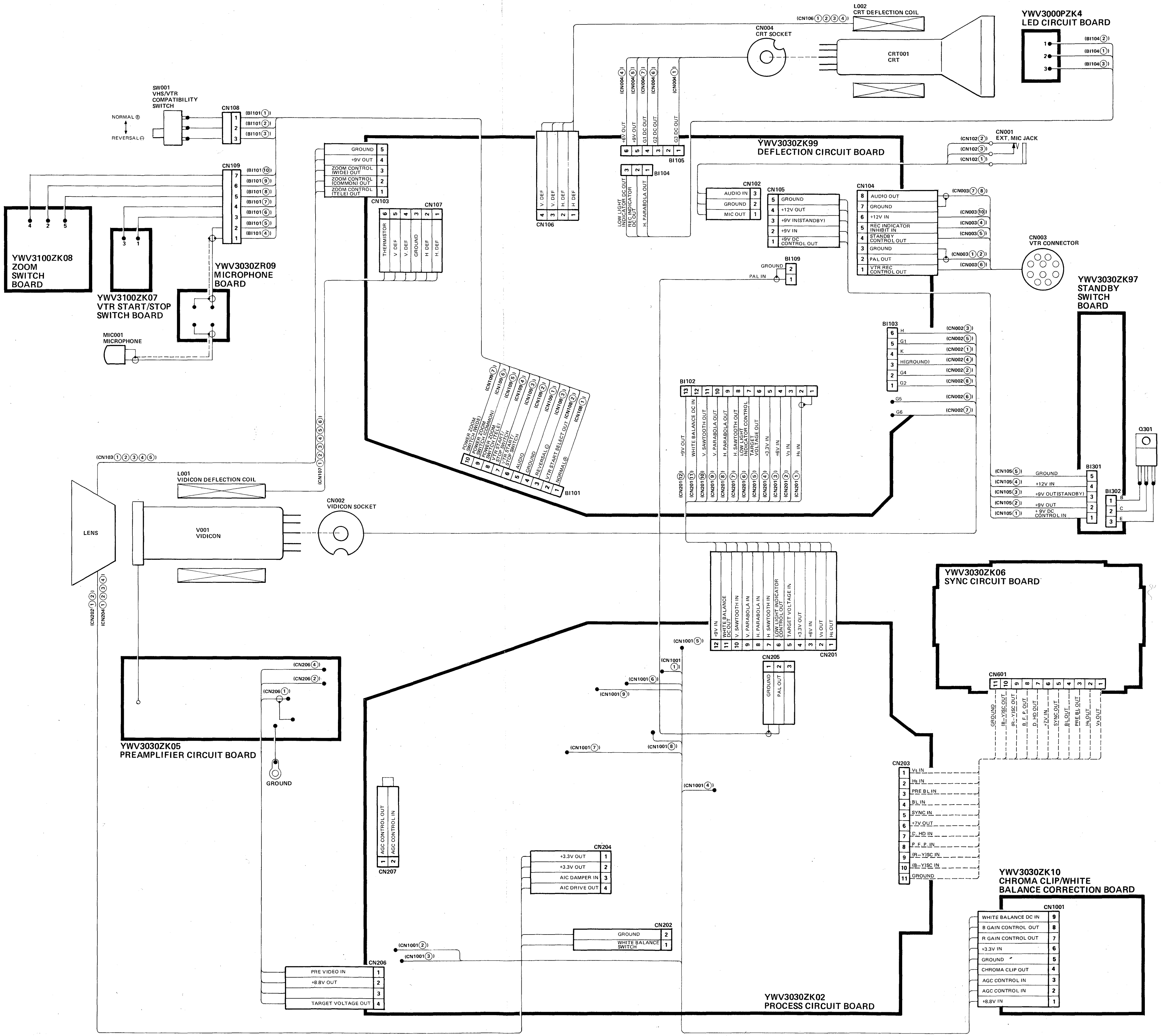


BLOCK RESISTOR




BR601
EXBH85175JB
①
②
③
④
⑤
⑥
⑦
R6011 10K
R6012 2.2K
R6013 5.6K
R6014 5.6K
R6015 2.2K

# WIRING DIAGRAM



L002 CRT DEFLECTION COIL
CN004 CRT SOCKET
CRT001 CRT
YWV3000PZK4 LED CIRCUIT BOARD
SW001 VHS/VTR COMPATIBILITY SWITCH
NORMAL
REVERSAL
CN108
CN109
YWV3100ZK08 ZOOM SWITCH BOARD
YWV3100ZK07 VTR START/STOP SWITCH BOARD
YWV3030ZR09 MICROPHONE BOARD
MIC001 MICROPHONE
GROUND
+9V OUT
ZOOM CONTROL (WIDE) OUT
ZOOM CONTROL (COMMON) OUT
ZOOM CONTROL (TELE) OUT
CN103
CN107
THERMISTOR
V. DEF
H. DEF
CN106
BI105
BI104
LOW LIGHT INDICATOR DC OUT
REC INDICATOR OUT
H. PARABOLA OUT
YWV3030ZK99 DEFLECTION CIRCUIT BOARD
CN001 EXT. MIC JACK
CN102
AUDIO IN
MIC OUT
CN105
+12V OUT
+9V IN(STANDBY)
+9V IN
+9V DC CONTROL OUT
CN104
AUDIO OUT
+12V IN
REC INDICATOR INHIBIT IN
STANDBY CONTROL OUT
PAL OUT
VTR REC CONTROL OUT
CN003 VTR CONNECTOR
BI109
PAL IN
YWV3030ZK97 STANDBY SWITCH BOARD
BI103
BI102
BI101
POWER ZOOM SW (WIDE)
POWER ZOOM SW (COMMON)
POWER ZOOM SW (TELE)
VTR START/STOP SWITCH
AUDIO
REVERSAL
VTR START SELECT OUT
NORMAL
+9V OUT
WHITE BALANCE DC IN
V. SAWTOOTH OUT
V. PARABOLA OUT
H. PARABOLA OUT
H. SAWTOOTH OUT
LOW LIGHT INDICATOR CONTROL
TARGET VOLTAGE OUT
+3.3V IN
+6V IN
Vs IN
Hs IN
Q301
BI301
BI302
+12V IN
+9V OUT(STANDBY)
+9V OUT
+9V DC CONTROL IN
L001 VIDICON DEFLECTION COIL
CN002 VIDICON SOCKET
V001 VIDICON
LENS
YWV3030ZK06 SYNC CIRCUIT BOARD
CN601
CN201
CN205
YWV3030ZK05 PREAMPLIFIER CIRCUIT BOARD
GROUND
CN207
AGC CONTROL OUT
AGC CONTROL IN
CN204
+3.3V OUT
AIC DAMPER IN
AIC DRIVE OUT
CN202
WHITE BALANCE SWITCH
CN206
PRE VIDEO IN
+8.8V OUT
TARGET VOLTAGE OUT
CN203
Vs IN
Hs IN
PRE BL IN
BL IN
SYNC IN
+7V OUT
C. HD IN
B. F. P. IN
(R−Y)SC IN
(B−Y)SC IN
YWV3030ZK10 CHROMA CLIP/WHITE BALANCE CORRECTION BOARD
CN1001
B GAIN CONTROL OUT
R GAIN CONTROL OUT
CHROMA CLIP OUT
AGC CONTROL IN
+8.8V IN
YWV3030ZK02 PROCESS CIRCUIT BOARD

ORDER NO. VKD81070560C8

# Service Manual

**Vol. 4**

***Replacement Parts List***
***Exploded View***

## Colour Video Cameras
## WV-3030E/WV-3030N

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**Panasonic / National**

**Matsushita Electric Trading Co., Ltd.**
P.O. Box 288, Central Osaka Japan

Vol. 4

Important Notice

# REPLACEMENT PARTS LIST

1. Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by * mark are new parts used from this model.

**MODEL WV-3030E/3030N**

## MISCELLANEOUS

| SYMBOL NO. | PART NO. | DESCRIPTION |
|---|---|---|
| V001 | S4094P | Vidicon Tube |
| CRT001 ⚠ | 40CB4M | Cathode Ray Tube |
| C001 | ECQE16682N66 | Mettalized Polyester 0.0068μF 1600V |
| L001 | ELY-18A205B | Deflection Coil for Vidicon Tube |
| L002 | ELY15V100A | Deflection Coil for Cathode Ray Tube |
| CN001 | YWMOJ-B65 | External Mic Jack |
| CN002 | YWS8-612J01 | Vidicon Socket |
| CN003 | EMCU10B5T06 | Camera Cable and Cable Connector |
| CN004 | YWS7-560P-45 | CRT Socket |
| CN102-PF | EMCM0312C55 | 3 Pin Plug Female |
| CN103-PF | EMCHUM050IW | 5 Pin Outer Case of Connector |
| CN104-PF | EMCU10B5T06 | Connecting Wire Ass'y for CN104 and CN003 |
| CN106-PF | ELY15V100A | Connecting Wire Ass'y for CN106 and L002 |
| CN107-PF | ELY-18A205B | Connecting Wire Ass'y for CN107 and L001 |
| CN202-PF | EMCHUM0201W | 2 Pin Outer Case of Connector |
| CN204-PF | EMCHUM0401W | 4 Pin Outer Case of Connector |
| E001 | EHLKM02D | Connect Receptacle for CN202 and CN204 |
| M001 | *YWV3030KR04 | Upper Cover |
| M002 | YWCC500WB01 | Eye Cap |
| M003 | YWCC500FR03 | Eye Cap Holder |
| M004 | YWCC704LB01 | Lens |
| M005 | YWCC500FR04A | Lens Holder |
| M006 | YWCC500WM02B | Plate Spring |
| M007 | YWCC704AM02A | Accessory Shoe |
| M008 | YWCC704WM07 | Leaf Spring for Accessory Side |
| M009 | YWCC704FM02 | Screw for Accessory Shoe |
| M010 | YWCC704AM03B | Nut Plate for Accessory Shoe |
| M011 | YWV3030AM04 | Mounting Bracket B for Cover |
| M012 | *YWV3030EKR99 | Right Side Cover Assembly for WV-3030E |
|  | *YWV3030NKR99 | Right Side Cover Assembly for WV-3030N |
| M013 | *YWV3030HR99 | White Balance Knob **Assembly** |
| M014 | YWV3030HR04 | CC Filter Knob |
| M015 | YWV3030WR01 | Click Plate for Knob |
| M016 | *YWV3030AM01 | Knob Holder Plate |
| M017 | *YWV3030EKR98 | Left Side Cover Assembly for WV-3030E |
|  | *YWV3030NKR98 | Left Side Cover Assembly for WV-3030N |
| M018 | YWB26E2 | Vidicon Socket Cover |
| M019 | YWCC500LB17 | Insulator Paper for Vidicon Socket |
| M020 | YWCC500AM12B | Coil Chield Plate |
| M021 | YWCC500CM01B | Coil Chassis |
| M022 | *YWV3030CM01 | Lens Mounting |
| M023 | YWCC500FM02A | Coil Holder |
| M024 | YWCC500FM03A | Coil Guide |
| M025 | *YWV3030WB99 | Crystal Filter Assembly |
| M026 | YWCC500XK10A | Shield Plate B for Vidicon |
| M027 | *YWV3030FM01 | Screw for Crystal Filter |
| M028 | *YWV3030HR01 | Red Gain Knob |
| M029 | *YWV3030HR02 | Blue Gain Knob |
| M030 | YWCC500FR05 | Serial No. Plate |
| M031 | *YWV3030UR03 | Standby Indicator Plate |
| M032 | *YWV3030KR03 | Rear Cover |
| M033 | YWV3000EUM1 | CRT Panel |
| M034 | *YWV3030AM03 | Support Plate for CRT |
| M035 | YWCC500WM01 | Spring for CRT |
| M036 | *YWV3030AM02 | Mounting Bracket A for Printed Board |
| M037 | YWCC704AM04 | Mounting Bracket B for CRT |
| M038 | YWV3804WB03 | Rubber Neck for CRT |
| M039 | YWCC500XK09A | Shield Plate A for Vidicon |
| M040 | YWCC500AM11 | Shield Plate B for Preamplifier |
| M044 | *YWV3030EUR1 | Main Label for WV-3030E |
|  | *YWV3030NUR1 | Main Label for WV-3030N |
| M047 | *YWV3030EUR2 | X Ray Label for WV3030E |
| M049 | V2SA0005A4 | Mounting Bracket E |
| M050 | YW614218 | Zoom Lens Housing for WV-3030E |
|  | YW614222 | Zoom Lens Housing for WV-3030N |
| M051 | YW318131 | Zoom Lever |
| M052 | YW614022 | Focus Band |
| M053 | YW614023 | Zoom Band |
| M054 | YW614039A | Rubber Cap |
| M055 | YW614037 | Lens Hood |
| M056 | YW614038 | Lens Cap |

## YWV3030ZK99
## DEFLECTION CIRCUIT BOARD

| SYMBOL NO. | PART NO. | DESCRIPTION |
|---|---|---|
| PCB001 | *YWV3030ZK99 | Printed Circuit Board Assembly |
| IC101 | YHSNJM4558D | Integrated Circuit |
| IC102 | NJM4560D | Integrated Circuit |
| IC103 | AN6055 | Integrated Circuit |
| IC104 | NJM4556D | Integrated Circuit |
| IC105 | NJM4556DT | Integrated Circuit |
| IC106 | YHSNJM4558D | Integrated Circuit |
| IC107 | AN374P | Integrated Circuit |
| IC108 | AN5750 | Integrated Circuit |
| IC109 | AN6914 | Integrated Circuit |
| Q101, 102 | 2SC2377-CD | Transistor |
| Q103, 104 | 2SA749A |  |
| Q105 | 2SC1980-RST | Transistor |
| Q106 | 2SD636-QRS | Transistor |
| Q107 | 2SB641-QRS | Transistor |
| Q108 | 2SD636-QRS | Transistor |
| Q109 | 2SB641-QRS | Transistor |
| Q110 | 2SD638-QR | Transistor |
| Q111 | 2SD975 | Transistor |
| Q112 | 2SD638-QR | Transistor |
| Q113 | 2SB641-QRS | Transistor |
| Q114 | 2SD636-QRS | Transistor |
| Q115 | 2SC1473NCQRS | Transistor |
| Q116 | 2SD661-TU | Transistor |
| Q117 | 2SB641-QRS | Transistor |

| SYMBOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| Q118 | 2SD636-QRS | Transistor | | |
| Q119 | 2SD975 | Trnasistor | | |
| Q120 | 2SC2377-CD | Transistor | | |
| Q121 | 2SA838-CD | Transistor | | |
| Q122 | 2SA749A | Transistor | | |
| Q123 | 2SD638-QR | Transistor | | |
| Q124 | 2SC1980-RST | Transistor | | |
| Q126 | 2SD636-QRS | Transistor | | |
| D101~105 | MA165 | Diode | | |
| D106 | YUDRU2M | Diode | | |
| D107~109 | MA165 | Diode | | |
| R101 | ERD10TJ123 | Carbon | 12KΩ | 1/8W |
| R102 | ERD10TJ562 | Carbon | 5.6KΩ | 1/8W |
| R103 | ERD10TJ682 | Carbon | 6.8KΩ | 1/8W |
| R104 | ERD10TJ332 | Carbon | 3.3KΩ | 1/8W |
| R105 | ERD10TJ123 | Carbon | 12KΩ | 1/8W |
| R106 | ERC10TJ303 | Carbon | 30KΩ | 1/8W |
| R107 | ERD10TJ152 | Carbon | 1.5KΩ | 1/8W |
| R108,109 | ERD10TJ512 | Carbon | 5.1KΩ | 1/8W |
| R110 | ERD10TJ682 | Carbon | 6.8KΩ | 1/8W |
| ~~R111~~ | ~~ERD10TJ203~~ | ~~Carbon~~ | ~~20KΩ~~ | ~~1/8W~~ |
| R112 | ERD10TJ682 | Carbon | 6.8KΩ | 1/8W |
| R113,114 | ERD10TJ331 | Carbon | 330Ω | 1/8W |
| R115 | ERD10TJ912 | Carbon | 9.1KΩ | 1/8W |
| R116 | ERD10TJ183 | Carbon | 18KΩ | 1/8W |
| R117 | ERD10TJ221 | Carbon | 220Ω | 1/8W |
| R118 | ERD10TJ223 | Carbon | 22KΩ | 1/8W |
| R119 | ERQ25CKF1003 | Metal | 100KΩ | 1/4W |
| R120 | ERD10TJ393 | Carbon | 39KΩ | 1/8W |
| R121 | ERD10TJ561 | Carbon | 560Ω | 1/8W |
| R122 | *ERO10CKF1102 | Metal | 11KΩ | 1/8W |
| R123 | *ERO10CKF5601 | Metal | 5.6KΩ | 1/8W |
| R124 | ERD10TJ2R2 | Carbon | 2.2Ω | 1/8W |
| R125 | ERD10TJ152 | Carbon | 1.5KΩ | 1/8W |
| R126 | ERD10TJ223 | Carobn | 22KΩ | 1/8W |
| R127 | ERD10TJ181 | Carbon | 180Ω | 1/8W |
| R128 | *ERQ10CKF62RO | Metal | 62Ω | 1/8W |
| R129 | ERD10TJ223 | Carbon | 22KΩ | 1/8W |
| R130 | ERSB39J332 | Thermal | 3.3KΩ | |
| R131 | ERD10TJ102 | Carbon | 1KΩ | 1/8W |
| R132 | ERD10TJ274 | Carbon | 270KΩ | 1/8W |
| R133 | ERD10TJ910 | Carbon | 91Ω | 1/8W |
| R134 | ERD10TJ103 | Carbon | 10KΩ | 1/8W |
| R135 | ERD10TJ512 | Carbon | 5.1KΩ | 1/8W |
| R136 | ERD10TJ561 | Carbon | 560Ω | 1/8W |
| R137 | ERD10TJ432 | Carbon | 4.3KΩ | 1/8W |
| R138 | ERD10TJ332 | Carbon | 3.3KΩ | 1/8W |
| R139 | ERO25CKF3003 | Metal | 300KΩ | 1/4W |
| R140 | ERD10TJ391 | Carbon | 390Ω | 1/8W |
| R141 | *ERO10CKF33R0 | Metal | 33Ω | 1/8W |
| R142 | ERD10TJ222 | Carbon | 2.2KΩ | 1/8W |
| R143 | ERD10TJ471 | Carbon | 470Ω | 1/8W |
| R146~148 | ERD10TJ563 | Carbon | 56KΩ | 1/8W |

| SYMBOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| R149,150 | ERD10TJ224 | Carbon | 220KΩ | 1/4W |
| R151 | ERD10TJ133 | Carbon | 13KΩ | 1/8W |
| R152 | ERD10TJ753 | Carbon | 75KΩ | 1/8W |
| R153 | ERD10TJ822 | Carbon | 8.2KΩ | 1/8W |
| R154 | ERD10TJ823 | Carbon | 8 2KΩ | 1/8W |
| R155 | ERD10TJ472 | Carbon | 4.7KΩ | 1/8W |
| R156 | ERD10TJ152 | Carbon | 1.5KΩ | 1/8W |
| R157 | ERD10TJ683 | Carbon | 68KΩ | 1/8W |
| R158 | ERD10TJ2R7 | Carbon | 2.7Ω | 1/8W |
| R159 | ERD10TJ562 | Carbon | 5.6KΩ | 1/8W |
| R160 | ERD10TJ563 | Carbon | 56KΩ | 1/8W |
| R161 | ERD10TJ152 | Carbon | 1.5KΩ | 1/8W |
| R162 | ERD10TJ332 | Carbon | 3.3KΩ | 1/8W |
| R163 | ERD10TJ472 | Carbon | 4.7KΩ | 1/8W |
| R164 | ERD10TJ241 | Carbon | 240Ω | 1/8W |
| R165 | ERD10TJ272 | Carbon | 2.7KΩ | 1/8W |
| R166 | ERD10TJ821 | Carbon | 820Ω | 1/8W |
| R167 | ERD10TJ242 | Carbon | 2.4KΩ | 1/8W |
| R168 | ERD10TJ222 | Carbon | 2.2KΩ | 1/8W |
| R169 | ERD10TJ223 | Carbon | 22KΩ | 1/8W |
| R170 | ERD10TJ102 | Carbon | 2KΩ | 1/8W |
| ~~R171~~ | ~~ERD25FJ102~~ | ~~Carbon~~ | ~~1KΩ~~ | ~~1/4W~~ |
| R172 | ERD10TJ333 | Carbon | 33KΩ | 1/8W |
| R173 | ERD10TJ391 | Carbon | 390Ω | 1/8W |
| R174 | ERD10TJ334 | Carbon | 330KΩ | 1/8W |
| R175 | ERD10TJ101 | Carbon | 100Ω | 1/8W |
| R176 | ERD25FJ395 | Carbon | 3.9MΩ | 1/4W |
| R177 | ERD10TJ103 | Carbon | 10KΩ | 1/8W |
| R178 | ERD10TJ334 | Carbon | 330KΩ | 1/8W |
| R179 | ERD25FJ225 | Carbon | 2.2MΩ | 1/4W |
| R180 | ERD10TJ224 | Carbon | 220KΩ | 1/8W |
| R181 | ERD25FJ564 | Carbon | 560KΩ | 1/4W |
| R182 | ERD10TJ101 | Carbon | 100Ω | 1/8W |
| R183 | ERD10TJ362 | Carbon | 3.6KΩ | 1/8W |
| R184 | ERD10TJ133 | Carbon | 13KΩ | 1/8W |
| R185 | ERD10TJ2R2 | Carbon | 2.2Ω | 1/8W |
| R186 | ERD10TJ562 | Carbon | 5.6KΩ | 1/8W |
| R187 | ERD10TJ202 | Carbon | 2KΩ | 1/8W |
| R188 | ERD10TJ563 | Carbon | 56KΩ | 1/8W |
| R189 | ERD25FJ152 | Carbon | 1.5KΩ | 1/8W |
| R190 | ERD10TJ221 | Carbon | 220Ω | 1/8W |
| R191 | ERD10TJ101 | Carbon | 100Ω | 1/8W |
| R192 | ERD10TJ470 | Carbon | 47Ω | 1/8W |
| R193 | ERD10TJ151 | Carbon | 150Ω | 1/8W |
| R194 | ERD10TJ621 | Carbon | 620Ω | 1/8W |
| R195 | ERD10TJ821 | Carbon | 820Ω | 1/8W |
| R196 | ERD10TJ223 | Carbon | 2 2KΩ | 1/8W |
| R197 | ERD10TJ154 | Carbon | 150KΩ | 1/8W |
| R198 | ERD10TJ332 | Carbon | 3.3KΩ | 1/8W |
| R199 | ERD10TJ562 | Carbon | 5.6KΩ | 1/8W |
| R200 | ERD10TJ563 | Carbon | 56KΩ | 1/8W |
| BR101 | EXB-H89119JB | Block Resistor | | |
| BR102 | EXB-H86120JB | Block Resistor | | |
| BR103 | EXB-H85149JB | Block Resistor | | |
| BR104 | EXB-H87121JB | Block Resistor | | |
| BR105 | EXB-H85178JB | Block Resistor | | |

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| BR106 | EXB-H85131JB | Block Resistor | | |
| BR107 | YWA100 | Block Resistor | | |
| BR108 | EXBH84167JB | Block Resistor | | |
| CR101~106 | YWH0651A10K | Variable Resistor | 10K Ω | |
| VR107 | YWH0651A3R3K | Variable Resistor | 3.3K Ω | |
| VR108 | YWH0621A22K | Metallized Plastic | 22K Ω | |
| VR109 | YWH0621A100 | Metallized Plastic | 100 Ω | |
| VR110 | YWH0651A10K | Variable Resistor | 10K Ω | |
| VR111 | YWH0651A22K | Variable Resisotr | 22K Ω | |
| VR112 | YWH0621A100K | Variable Resisor | 100K Ω | |
| VR113 | YWH0651A3R3K | Variable Resistor | 3.3K Ω | |
| VR114 | YWH0651A1M | Variable Resistor | 1M Ω | |
| VR115 | YWH0621A100 | Variable Resisotr | 100 Ω | |
| VR116 | YWH0651A2R2K | Variable Resistor | 2.2K Ω | |
| VR117 | YWH0621A100 | Variable Resistor | 100 Ω | |
| VR118 | YWH0651A330K | Variable Resistor | 330KΩ | |
| VR119,120 | YW6M1S2MM | Variable Resisor | 2MΩ | |
| VR121 | YWH0651A330K | Variable Resistor | 330KΩ | |
| C101 | ECEA1HK010 | Electrolytic | 1μF | 50V |
| C102 | ECEA1AS221 | Electrolytic | 220μF | 10V |
| C103 | ECEA0JS470 | Electrolytic | 47μF | 6.3V |
| C104 | ECEA1HKR22 | Electrolytic | 0.22μF | 50V |
| C105 | ECKF1H151KB | Ceramic | 150pF | 50V |
| C106 | ECEA1HKR22 | Electrolytic | 0.22μF | 50V |
| C107 | ECQV05103JZ | Metallized Plastic | 0.01μF | 50V |
| C108 | ECQV05563N | Metallized Plastic | 0.056μF | 50V |
| C109 | ECQP1122JZ | Polypropylene | 0.0012μF | 100V |
| C110,111 | ECEA1CS100 | Electrolytic | 10μF | 16V |
| C113 | ECEA2SA3R3 | Electrolytic | 3.3μF | 100V |
| C114 | ECEA0JSS221 | Electrolytic | 220μF | 6.3V |
| C115 | ECQE2473KZ | Metal | 0.047μF | 250V |
| C116 | ECEA1ES220 | Electrolytic | 22μF | 25V |
| C117 | ECSF10E10 | Tantalum | 10μF | 10V |
| C118 | ECEA1AS221 | Electrolytic | 220μF | 10V |
| C119 | ECEA1EN4R7S | Electrolytic | 4.7μF | 25V |
| C120 | ECSF10E4R7K | Tantalum | 4.7μF | 10V |
| C121 | ECQM1H562KZ | Polyester | 0.0056μF | 50V |
| C122 | ECQV05104JZ | Metallized Plastic | 0.1μF | 50V |
| C123 | ECQV05333JZ | Metallized Plastic | 0.033μF | 50V |
| C124 | ECKF1H681KB | Ceramic | 680pF | 50V |
| C125 | ECEA1CS100 | Electrolytic | 10μF | 16V |
| C126 | ECEA0JSS470 | Electrolytic | 47μF | 6.3V |
| C127 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C129 | ECEA0JSS101 | Electrolytic | 100μF | 6.3V |
| C130 | ECEA1AS470 | Electrolytic | 47μF | 10V |
| C131,132 | ECSF6E68Z | Tantalum | 68μF | 6.3V |
| C133 | ECQP1301JZ | Polypropylene | 300pF | 100V |
| C134 | ECQP1391JZ | Polypropylene | 390pF | 100V |
| C135 | ECCF1H330K | Ceramic | 33pF | 50V |
| C136 | ECQV05224JZ | Metallized Plastic | 0.22μF | 50V |
| C137 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C138 | ECQK1224JG | Plastic Capacitor | 0.22μF | 100V |
| C139 | ECKF1H102KB | Ceramic | 1000pF | 50V |
| C140 | ECEA1ASS470 | Electrolytic | 47μF | 10V |
| C141 | ECEA0JSS330 | Electrolytic | 33μF | 6.3V |
| C142 | ECEA1HK010 | Electrolytic | 1μF | 50V |
| C143 | ECKF1H102KB | Ceramic | 1000pF | 50V |
| C144 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C145 | ECQV05224JZ | TF Capacitor | 0.22μF | 50V |
| C146 | ECEA1EN4R7S | Electrolytic | 4.7μF | 25V |
| C147 | ECQV05103JZ | Metallized Plastic | 0.01μF | 50V |
| C148 | ECEA1HKR22 | Electrolytic | 0.22μF | 50V |
| C150,151 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C152 | ECQV05103JZ | Metallized Plastic | 0.01μF | 50V |
| C153 | ECEA0JS471 | Electrolytic | 470μF | 6.3V |
| C154 | ECQV05237JZ | Metallized Plastic | 0.027μF | 50V |
| C155 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C156 | ECQV05183JZ | Metallized Plastic | 0.018μF | 50V |
| C157 | ECQV05153JZ | Metallized Plastic | 0.015μF | 50V |
| C158 | ECQV05273JZ | Metallized Plastic | 0.027μF | 50V |
| C159 | ECQV05103JZ | Metallized Plastic | 0.01μF | 50V |
| C160 | ECEA0JSS470 | Electrolytic | 47μF | 6.3V |
| C161 | ECEA1ASS101 | Electrolytic | 100μF | 10V |
| C162 | ECQP1103JZ | Polypropylene | 0.01μF | 100V |
| C163 | ECEA1AS470 | Electrolytic | 47μF | 10V |
| C164 | ECEA1ASS331 | Electrolytic | 330μF | 10V |
| C165 | ECEA1ASS470 | Electrolytic | 47μF | 10V |
| C166,167 | ECQE4103KZ | Metal | 0.01μF | 400V |
| C168 | ECQE10103KV | Metal | 0.01μF | 1000V |
| C169 | ECEA2AS4R7 | Electrolytic | 4.7μF | 100V |
| C170 | ECCF1H101J | Ceramic | 100pF | 50V |
| C171 | ECEA2ASR47 | Electrolytic | 0.47μF | 100V |
| C172 | ECQV05103JZ | Metallized Plastic | 0.01μF | 50V |
| C173 | ECEA2AS010 | Electrolytic | 1μF | 100V |
| C174 | ECEA0JSS470 | Electrolytic | 47μF | 6.3V |
| C175 | ECQV05823N | Metallized Plastic | 0.082μF | 50V |
| C176 | ECSF6E6R8 | Tantalum | 6.8μF | 6.3V |
| C180 | ECEA1EK4R7 | Electrolytic | 4.7μF | 25V |
| L101 | ELQ8R2D016M | Inductor | 8.2μH | |
| L102 | YWL10103JZ | Inductor | 10mH | |
| L103 | YWEF7303MH | Inductor | 33mH | |
| L104 | ELH-5L62 | Linearity Coil | | |
| L105 | ELQ391D028 | Inductor | 390μH | |
| CL101 | ZB-6D728 | Trap | 4.43mH | |
| T101 | YWDH10 | Drive Transformer | | |
| T102 ⚠ | YWH1GHPACK4 | Fly-Back Transformer | | |
| F101 ⚠ | YW1CPN50 | Fuse | 2A | |
| CN102-JM | EMCS0352M | 3-Pin Jack Male | | |
| CN103-JM | EMCS0552M | 5-pin Jack Male | | |
| CN104-JM | EMCS0852M | 8-Pin Jack Male | | |
| CN105-JM | EMCS0552M | 5-Pin Jack Male | | |
| CN106-JM | EMCS0452M | 4-Pin Jack Male | | |
| CN107-JM | EMCS0652M | 6-Pin Jack Male | | |
| BI101 | EMCL1005D42V | Connecting Wire Ass'y for BI101, CN108 and CN109 | | |
| BI102 | EMCM1210B65V | Connecting Wire Ass'y for BI102 and CN201 | | |
| BI103 | EMCL0613D63W | 6-Pin Connecting Wire Ass'y for BI003 and CN002 | | |
| BI104 | EMCL0309D62 | Connecting Wire Ass'y for BI104 and LED Circuit Board | | |

| SYMBOL NO. | PART NO. | DESCRIPTION |
|---|---|---|
| BI105 | YWS7-560P-45 | Connecting Wire Ass'y for BI105 and CN004 |
| BI109 | EMCM0315B52 | Connecting Wire Ass'y for BI109 and CN205 |
| M045 | YWV3030XK01 | Deflection Shield Plate |
| M046 ⚠ | YW-G-UR02A | X-Ray B Label for WV-3030E |

## YWV3030ZK02
## PROCESS CIRCUIT BOARD

| SYMBOL NO. | PART NO. | DESCRIPTION |
|---|---|---|
| PCB002 | *YWV3030ZK02 | Printed Circuit Board Assembly |
| IC201 | AN6015 | Integrated Circuit |
| IC202 | AN6012 | Integrated Circuit |
| IC203 | AN6022 | Integrated Circuit |
| IC204 | AN6031 | Integrated Circuit |
| IC205 | AN6045 | Integrated Circuit |
| IC206 | AN614 | Integrated Circuit |
| IC207 | HD74LS02A | Integrated Circuit |
| IC208 | NJM4556D | Integrated Circuit |
| IC209 | YHSNJM4558D | Integrated Circuit |
| IC210 | EHMK220L20S | Integrated Circuit |
| IC211 | EHMK727A98S | Integrated Circuit |
| IC212 | EHMK111A97 | Integrated Circuit |
| Q201 | 2SB793A-RST | Transistor |
| Q202 | 2SC2377-CD | Transistor |
| Q203,204 | 2SD636-QRS | Transistor |
| Q205,206 | 2SC2377-CD | Transistor |
| Q207~210 | 2SD636-QRS | Transistor |
| Q211 | 2SC2377-CD | Transistor |
| Q212 | 2SD636-QRS | Transistor |
| Q213 | 2SC2377-CD | Transistor |
| Q214 | 2SA838-CD | Transistor |
| Q215,216 | 2SC2377-CD | Transistor |
| D201 | MA165 | Diode |
| D202 | MA26W | Diode |
| D203,204 | MA165 | Diode |
| D206 | MA165 | Diode |
| R201 | ERD10TJ331 | Carbon 330Ω 1/8W |
| R203 | ERD10TJ104 | Carbon 100KΩ 1/8W |
| R204 | ERD10TJ561 | Carbon 560Ω 1/8W |
| R205 | ERD10TJ103 | Carbon 10KΩ 1/8W |
| R206 | ERD10TJ272 | Carbon 2.7KΩ 1/8W |
| R207 | ERD10TJ471 | Carbon 470Ω 1/8W |
| R208 | ERD10TJ102 | Carbon 1KΩ 1/8W |
| R209 | ERD10TJ393 | Carbon 39KΩ 1/8W |
| R210 | ERD10TJ752 | Carbon 7.5KΩ 1/8W |
| R211 | ERD25FJ102 | Carbon 1KΩ 1/4W |
| R212 | YWLF14F1001 | Metal 1KΩ 1/4W |
| R213 | ERD10TJ562 | Carbon 5.6KΩ 1/8W |
| R214 | ERO10CKF1001 | Metal 1KΩ 1/8W |
| R215 | ERD10TJ752 | Carbon 7.5KΩ 1/8W |
| R216 | ERD10TJ183 | Carbon 18KΩ 1/8W |
| R217 | ERD10TJ103 | Carbon 10KΩ 1/8W |
| R218 | ERD10TJ102 | Carbon 1KΩ 1/8W |
| R219 | ERD10TJ821 | Carbon 820Ω 1/8W |
| R220 | ERD10TJ331 | Carbon 330Ω 1/8W |
| R221 | ERD10TJ822 | Carbon 8.2KΩ 1/8W |
| R222 | ERD10TJ152 | Carbon 1.5KΩ 1/8W |
| R223 | ERD10TJ331 | Carbon 330Ω 1/8W |
| R224 | YWLF14F1001 | Metal 1KΩ 1/4W |
| R225 | ERD10TJ472 | Carbon 4.7KΩ 1/8W |
| R226 | ERD10TJ561 | Carbon 560Ω 1/8W |
| R227 | ERD10TJ562 | Carbon 5.6KΩ 1/8W |
| R228 | ERD10TJ223 | Carbon 22KΩ 1/8W |
| R229,230 | ERD10TJ103 | Carbon 10KΩ 1/8W |
| R231,232 | ERD10TJ102 | Carbon 1KΩ 1/8W |
| R233 | ERD10TJ103 | Carbon 10KΩ 1/8W |
| R234,235 | ERD10TJ391 | Carbon 390Ω 1/8W |
| R236 | ERD10TJ562 | Carbon 5.6KΩ 1/8W |
| R237,238 | ERD10TJ104 | Carbon 100KΩ 1/8W |
| R240 | ERD10TJ183 | Carbon 18KΩ 1/8W |
| R241 | ERD10TJ332 | Carbon 3.3KΩ 1/8W |
| R242 | ERD10TJ102 | Carbon 1KΩ 1/8W |
| R243 | ERSB39J102 | Thermal 1KΩ |
| R244 | ERD10TJ102 | Carbon 1KΩ 1/8W |
| R246 | ERD10TJ102 | Carbon 1KΩ 1/8W |
| R248 | ERD10TJ103 | Carbon 10KΩ 1/8W |
| R249 | ERD10TJ561 | Carbon 560Ω 1/8W |
| R250 | ERD10TJ473 | Carbon 47KΩ 1/8W |
| R252 | ERSB39J152 | Thermal 1.5KΩ |
| R255 | ERD10TJ750 | Carbon 75Ω 1/8W |
| R256 | ERD10TJ273 | Carbon 27KΩ 1/8W |
| R257 | ERD10TJ332 | Carbon 3.3KΩ 1/8W |
| R261,262 | ERD10TJ152 | Carbon 1.5KΩ 1/8W |
| R263 | ERD10TJ561 | Carbon 560Ω 1/8W |
| R264 | ERD10TJ683 | Carbon 68KΩ 1/8W |
| TH201 | ERTD2FHL153S | Ther Mister 15KΩ 2W |
| BR201 | EXBH85146JB | Block Resistor |
| BR202 | EXBH85217JB | Block Resistor |
| BR203 | EXBH85218SB | Block Resistor |
| BR204 | EXBH83177JB | Block Resistor |
| BR205 | EXBH84155JB | Block Resistor |
| BR207 | EXBH84194JB | Block Resistor |
| BR208 | EXBH85145JB | Block Resistor |
| BR209 | EXBH86126JB | Block Resistor |
| BR210 | EXBH88117KB | Block Resistor |
| BR211 | EXBH86118KB | Block Resistor |
| BR212 | EXBH86126JB | Block Resistor |
| BR213 | EXBH86128JB | Block Resistor |
| BR214 | EXBH83141JB | Block Resistor |
| BR215 | EXBH83139JB | Block Resistor |
| BR216 | EXBH86198JB | Block Resistor |
| BR217 | EXBH84130SB | Block Resistor |
| BR219 | EXBH86127JB | Block Resistor |
| BR220 | EXBH88171JB | Block Resistor |
| BR221 | EXBH85199JB | Block Resistor |
| BR222 | EXBH84174JB | Block Resistor |
| BR223 | EXBH94129JB | Block Resistor |
| VR201 | YWH0651A470 | Variable Resistor 470Ω |
| VR202 | YWH0651A10K | Variable Resistor 10KΩ |
| VR203 | YWH0651A6R8K | Variable Resistor 6.8KΩ |
| VR204 | YWH0651A1K | Variable Resistor 1KΩ |
| VR205 | YWH0651A3R3K | Variable Resistor 3.3KΩ |
| VR206 | YWH0651A2R2K | Variable Resistor 2.2KΩ |

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| VR207 | YWH0651A47K | Variable Resistor | 47KΩ | |
| VR208~211 | YWH0651A100K | Variable Resistor | 100KΩ | |
| VR212,213 | YWH0651A22K | Variable Resistor | 22KΩ | |
| VR214 | YWH0651A10K | Variable Resistor | 10KΩ | |
| VR215 | YWH0651A47K | Variable Resistor | 47KΩ | |
| VR216 | YWH0651A10K | Variable Resistor | 10KΩ | |
| VR217,218 | YWH0651A100K | Variable Resistor | 100KΩ | |
| VR219,220 | YWH0651A47K | Variable Resistor | 47KΩ | |
| VR221,222 | VN20E55330KB | Variable Resistor | 30KΩ | |
| VR223~226 | YWH0651A100K | Variable Resistor | 100KΩ | |
| VR227,228 | YWH0651A22K | Variable Resistor | 22KΩ | |
| VR229 | YWH0651A10K | Variable Resistor | 10KΩ | |
| VR230 | YWH0651A4R7K | Variable Resistor | 4.7KΩ | |
| VR231 | YWH0651A680K | Variable Resistor | 680KΩ | |
| C201,202 | ECEA0JS470 | Electrolytic | 47μF | 6.3V |
| C203 | ECEA1AN220S | Electrolytic | 22μF | 10V |
| C204 | ECQV05393JZ | Metallized Plastic | 0.039μF | 50V |
| C205 | ECEA1AS330 | Electrolytic | 33μF | 10V |
| C206 | ECEA1ASS330 | Electrolytic | 33μF | 10V |
| C207 | ECQV05393JZ | Metallized Plastic | 0.039μF | 50V |
| C208 | ECSF6E47 | Tantalum | 47μF | 6.3V |
| C209 | ECEA1HK010 | Electrolytic | 1μF | 50V |
| C210 | ECEA1AN220S | Electrolytic | 22μF | 10V |
| C211 | ECKF1H221KB | Ceramic | 220pF | 50V |
| C212 | ECSF6E47 | Tantalum | 47μF | 6.3V |
| C214 | ECEA1CN100S | Electrolytic | 10μF | 16V |
| C215 | ECQV05393JZ | Metallized Plastic | 0.039μF | 50V |
| C216 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C217 | ECEA0JSS470 | Electrolytic | 47μF | 6.3V |
| C218 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C219 | ECEA0JSS471 | Electrolytic | 470μF | 6.3V |
| C220,221 | ECEA1AS330 | Electrolytic | 33μF | 10V |
| C222 | ECKF1H222MD | Ceramic | 2200pF | 50V |
| C223 | ECKF1H221KB | Ceramic | 220pF | 50V |
| C224,225 | ECEA0JK220 | Electrolytic | 22μF | 6.3V |
| C226 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C227 | ECEA1AS330 | Electrolytic | 33μF | 10V |
| C228,229 | ECKF1H102KB | Ceramic | 1000pF | 50V |
| C230,231 | ECDF1H222MD | Ceramic | 2200pF | 50V |
| C232 | ECCF1H020C | Ceramic | 2pF | 50V |
| C233 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C234 | ECSF10E47 | Tantalum | 47μF | 10V |
| C235 | ECEA0JSS470 | Electrolytic | 47μF | 6.3V |
| C236~238 | ECEA1HK0R1 | Electrolytic | 0.1μF | 50V |
| C239 | ECEA1ASS330 | Electrolytic | 33μF | 10V |
| C240,241 | ECKF1H561KB | Ceramic | 560pF | 50V |
| C242~245 | ECDF1H222MD | Ceramic | 2200pF | 50V |
| C246 | ECEA0JS470 | Electrolytic | 47μF | 6.3V |
| C247 | ECDF1H222MD | Ceramic | 2200pF | 50V |
| C248 | ECCF1H020C | Ceramic | 2pF | 50V |
| C249 | ECEA1CK100 | Electrolytic | 10μF | 16V |
| C250,251 | ECEA1ASS330 | Electrolytic | 33μF | 10V |
| C252 | ECEA0JS470 | Electrolytic | 47μF | 6.3V |
| C253 | ECKF1H121KB | Ceramic | 120pF | 50V |
| C254 | ECCF1H330J | Ceramic | 33pF | 50V |

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| C255 | ECKF1H121KB | Ceramic | 120 pF | 50V |
| C256 | ECEA0JSS470 | Electrolytic | 47μF | 63V |
| C257 | ECCF1H470JC | Ceramic | 47pF | 50V |
| C258 | ECKF1H151KB | Ceramic | 150pF | 50V |
| C259 | ECCF1H470JC | Ceramic | 47pF | 50V |
| C260 | ECSF10E4R7Z | Tantalum | 4.7μF | 10V |
| C261,262 | ECKF1H222MD | Ceramic | 2200pF | 50V |
| C263 | ECCF1H100J | Ceramic | 10pF | 50V |
| C264 | ECSF6E47 | Tantalum | 47μF | 6.3V |
| C267 | ECQP1621JZ | Polypropylene | 620pF | 100V |
| C270 | ECKF1H221KB | Cermaic | 220pF | 50V |
| VC201,202 | YWTZ03P450F | Trimmer Capacitor | 40pH | |
| L201 | YWL58R2J | Inductor | 8.2μH | |
| L202~205 | YWL515J | Inductor | 15μH | |
| L206 | ELQ181D014J | Inductor | 180μH | |
| L207 | YWEL06S18R2M | Inductor | 8.2μH | |
| L208 | ELEH8R2K | Inductor | 8.2μH | |
| L209 | ELEH8R2K | Inductor | 8.2μH | |
| L210 | ELQ181D014J | Inductor | 180μH | |
| L211 | YWL52R2J | Inductor | 2.2μH | |
| L212 | YWL522J | Inductor | 22μH | |
| L213 | YWL512J | Inductor | 12μH | |
| L214 | YWL58R2J | Inductor | 8.2μH | |
| L215 | YWL5101J | Inductor | 100μH | |
| L216 | YWL556J | Inductor | 56μH | |
| LC201 | YWLCF033 | Block Filter | | |
| LC202 | YWLCF080 | Block Filter | | |
| LC203 | YWLCF050 | Block Filter | | |
| LC204 | YWLCF096 | Block Filter | | |
| LC205 | YWLCF215 | Block Filter | | |
| LC206 | YWLCF210 | Block Filter | | |
| LC207,208 | YWLCF032 | Block Filter | | |
| LC209 | YWLCF095A | Block Filter | | |
| LC210 | YWLCF034 | Block Filter | | |
| DL201 | BFDRN645B81A | Delay Line | | |
| DL202 | EFDEN645A13A | Delay Line | | |
| Z201,202 | EPCA3R58MB3 | Ceramic Trap | | |
| Z203 | EFCA4R43MB3 | Ceramic Trap | | |
| Z204 | EFCA3R58MB3 | Ceramic Trap | | |
| T201 | ELT7Q701A | Intermediater Frequency | | |
| F201 | YWICP-N10 | Fuse | | |
| CN201-JM | EMCS1252M | 12-Pin Jack Male | | |
| CN202-JM | EMCS0252M | 2-Pin Jack Male | | |
| CN203-JM | 11647131 | 11-Pin Jack Male from CN601 | | |
| CN204-JM | EMCS0452M | 4-Pin Jack Male | | |
| CN205-JM | EMCS0352M | 3-Pin Jack Male | | |
| CN206-JM | EMCS0452M | 4-Pin Jack Male from Preamp. | | |
| CN207-JM | EMCS0252M | 2-Pin Jack Male | | |
| CN201-PF | EMCM1210B62 | Connecting Wire Ass'y for CN201 and B1102 | | |
| CN205-PF | EMCM0315B52 | Connecting Wire Ass'y for CN205 and B1109 | | |
| CN207-PF | EMCM0201S | 2-Pin Plug Female for AGC Check | | |
| CN1001-PF | EMCM0920D62W | 9-Pin Plug Female | | |
| M041 | YWCC900AM12 | Block Filter Shield Plate | | |

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|

### YWV3030ZK97 STANDBY SWITCH BOARD

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| PCB003 | YWV3030ZK97 | Printed Circuit Board Assembly | | |
| Q301 | 2SA1061-P | Transistor | | |
| D301 | LN217RP | Light Emitting Diode | | |
| R301 | ERD10TJ222 | Carbon | 2.2KΩ | 1/8W |
| SW301 | YWSSB0226LP | Standby Switch | | |
| BI301 | EMCM0507D42V | Connecting Wire Ass'y for BI301 and CN105 | | |
| BI302 | EMCL0310D32X | Connecting Wire Ass'y for BI302 and Q301 | | |

### YWV3000PZK4 L.E.D CIRCUIT BOARD

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| PCB004 | YWV3000PZK4 | Printed Circuit Board Assembly | | |
| D401 | LN23SRP.D | L.E.D (Red) | | |
| D402 | LN43SYP | L.E.D (Orange) | | |
| M048 | YWCC500FR02 | L.E.D Holder | | |

### YWV3030ZK05 PREAMPLIFIER CIRCUIT BOARD

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| PCB005 | *YWV3030ZK05 | Printed Circuit Board Assembly | | |
| IC501 | EHMK720A57 | Integrated Circuit | | |
| Q501 | 2SK218-QR | Transistor | | |
| D501 | MA26 | Diode | | |
| R501 | ERD25FJ565 | Carbon | 5.6MΩ | 1/4W |
| R502 | ERD10TJ104 | Carbon | 100KΩ | 1/8W |
| R503 | ERO50CKG2704 | Metal | 2.7MΩ | 1/2W |
| R504 | ERD10TJ181 | Carbon | 180Ω | 1/8W |
| R505 | ERD10TJ683 | Carbon | 68KΩ | 1/8W |
| C501 | ECQE1333JN | Metal | 0.033μF | 100V |
| C502 | ECEA1HKR22 | Electrolytic | 0.22μF | 50V |
| C503 | ECSF6E47Z | Tantalum | 47μF | 6.3V |
| C505 | ECSF6E47Z | Tantalum | 47μF | 6.3V |
| C506 | ECSF10E47Z | Tantalum | 47μF | 10V |
| C507 | ECCF1H060CC | Ceramic | 6pF | 50V |
| C508 | ECSF10E4R7 | Tantalum | 4.7μF | 10V |
| C509 | ECSF10E47Z | Tantalum | 47μF | 10V |
| C510 | ECCF1H020CC | Ceramic | 2pF | 50V |
| C511 | ECCF1H220JC | Ceramic | 22pF | 50V |
| C512 | ECSF6E47Z | Tantalum | 47μF | 6.3V |
| VC501 | ECV1NW40X74B | Trimmer Capacitor | 40PH | |
| L501 | YWPREL321 | Inductor | 320μH | |
| L502 | YWEL06S18R2M | Inductor | 8.2μH | |
| CN206-PF | EMCM0420B62X | 4-Pin Plug Female | | |

### YWV3030ZK06 SYNC CIRCUIT BOARD

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| PCB006 | *YWV3030ZK06 | Printed Circuit Board Assembly | | |
| IC601 | YWHD44007A | Integrated Cricuit | | |
| D601,602 | YUDIS2688 | Diode | | |
| X601 | YWNC18C17R7M | Cristal | | |
| R601 | ERD10TJ105 | Carbon | 1MΩ | 1/8W |
| R602 | ERD10TJ102 | Carbon | 1KΩ | 1/8W |
| BR601 | EXBH85175JB | Block Resistor | | |
| BR602 | EXBH83176JB | Block Resistor | | |
| C601 | ECQV05103JZ | Metallized Plastic | 0.01μF | 50V |
| C602 | ECCF1H151JC | Ceramic | 150pF | 50V |
| C603 | ECCF1H151JC | Metallized Plastic | 0.01μF | 50V |
| C604 | ECEA1HN010S | Electrolytic | 1μF | 50V |
| C605 | ECKF1H101KB | Ceramic | 100pF | 50V |
| C606 | ECKF1H102KB | Ceramic | 1000pF | 50V |
| C607 | ECEA1ASS221 | Electrolytic | 220μF | 10V |
| C608 | ECCF1H180JC | Ceramic | 18pF | 50V |
| C609 | ECCF1H080JC | Ceramic | 8pF | 50V |
| VC601 | ECV1NW20X74B | Trimmer Capacitor | 20pH | |
| T601 | ELL-7E012D | Oscillator Coil | | |
| CN601-JF | YW11647111 | 11-Pin Jack Female | | |
| M042 | *YWV3030XK02 | Sync Shield A Assembly | | |
| M043 | *YWV3030XK03 | Sync Shield B Assembly | | |

### YWV3030ZK10 CHORMA CLIP/WHITE BALANCE CORRECTION BOARD

| SYM-BOL NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| PCB010 | *YWV3030ZK10 | Printed Circuit Board Assembly | | |
| IC1001 | YHSNJM4558D | Integrated Circuit | | |
| Q1001 | 2SB641-QRS | Transistor | | |
| R1001,1002 | ERD10TJ105 | Carbon | 1MΩ | 1/8W |
| R1003,1004 | ERD10TJ273 | Carbon | 27KΩ | 1/8W |
| R1005 | ERD10TJ913 | Carbon | 91KΩ | 1/8W |
| R1006 | ERD10TJ103 | Carbon | 10KΩ | 1/8W |
| R1007 | ERD10TJ154 | Carbon | 150KΩ | 1/8W |
| R1008 | ERD10TJ124 | Carbon | 120KΩ | 1/8W |
| CN1001-JM | EMCS0951HL | 9 Pin Jack Male | | |

### YWV3030EXK5 PISTOL GRIP HANDLE ASSEMBLY

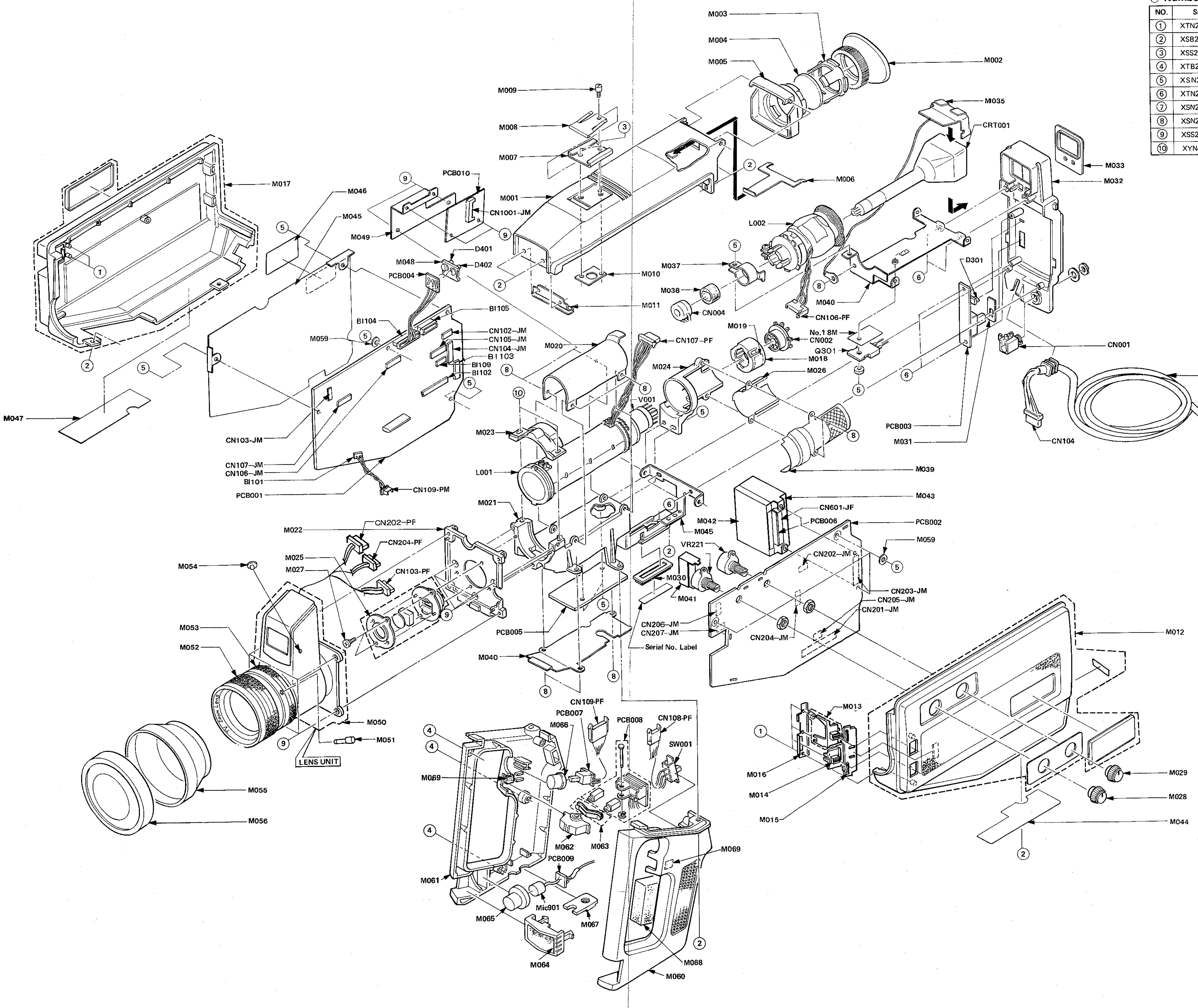
| SYM-BOL NO. | PART NO. | DESCRIPTION |
|---|---|---|
| PCB007 | YWV3100KZ07 | VTR Start/Stop Switch Board Assembly |
| PCB008 | YWV3100ZK08 | Zoom Switch Board Assembly |
| PCB009 | *YWV3030ZR09 | Microphone Board |
| MIC001 | WM034AY | Microphone |
| SW001 | YWSSM0124L | VHS/VTR Compatibility Switch |
| CN108-PF | EMCC0306D53 | 3-Pin Plug Female |
| CN109-PF | EMCC0720B62X | 7-Pin Plug Female |
| M060 | YWV3030KR05 | Handle Grip Right Cover |
| M061 | YWV3030KR06 | Handle Grip Left Cover |
| M062 | YWCC702KR03 | Handle Grip Switch Cover |
| M063 | YWCC702WM99 | Handle Grip Switch Spring |
| M064 | YWV3030DR99 | Wind Screen |
| M065 | YWV3030WB01 | Mic Holder |
| M066 | YWCC702HR02A | REC Knob |
| M067 | YWZC612FM01 | Mounting Base |
| M068 | V2FA0004A4 | Cushion for Grip Cover |

### ACCESSORY PARTS/PACKAGING PARTS

| SYM-BOL NO. | PART NO. | DESCRIPTION |
|---|---|---|
| M081 | *YWV3030ERB1 | Instruction Book for WV-3030E |
| | *YWV3030NRB1 | Instruction Book for WV-3030N |
| M082 | XZB26X40C05 | Polyethylene Bag for Instruction Book |
| M083 | XZB38X60A02 | Polyethylene Bag for Camera Unit |
| M084 | XZB20X35A02 | Polyethylene Bag for Cable |
| M086 | *YWV3030EPB1 | Packaging Case for WV-3030E |
| | *YWV3030NPB1 | Packaging Case for WV-3030N |
| M087 | *YWH52 | Hand Strap |

# EXPLODED VIEW

| | |
|---|---|
| PCB001 | YWV3030ZK99 |
| PCB002 | YWV3030ZK02 |
| PCB003 | YWV3030ZK97 |
| PCB004 | YWV3000PZK4 |
| PCB005 | YWV3030ZK05 |
| PCB006 | YWV3030ZK06 |
| PCB007 | YWV3100KZ07 |
| PCB008 | YWV3100ZK08 |
| PCB009 | YWV3030ZR09 |
| PCB010 | YWV3030ZK10 |
| V001 | S4094P |
| CRT001 | 40CB4M |
| Q301 | 2SA1061-P |
| D301 | LN217RP |
| D401 | LN23SRP D |
| D402 | LN43SYP |
| L001 | ELY-18A205B |
| L002 | ELY15V100A |
| CN001 | YWMOJ-B65 |
| VR221 | VN20E55330KB |
| VR222 | VN20E55330KB |
| CN002 | YWS8-612J01 |
| CN003 | EMCU10B5T06 |
| CN004 | YWS7-560P-45 |
| CN102-JM | EMCS0352M |
| CN103-JM | EMCS0552M |
| CN104-JM | EMCS0852M |
| CN105-JM | EMCS0552M |
| CN106-JM | EMCS0452M |
| CN107-JM | EMCS0652M |
| CN201-JM | EMCS1252M |
| CN202-JM | EMCS0252M |
| CN203-JM | 11647131 |
| CN204-JM | EMCS0452M |
| CN205-JM | EMCS0352M |
| CN206-JM | EMCS0452M |
| CN207-JM | EMCS0252M |
| CN601-JF | YW11647111 |
| CN1001-JM | EMCS0951HL |
| CN102-PF | EMCM0312C55 |
| CN103-PF | EMCHUM050IW |
| CN104-PF | EMCU108B5T06 |
| CN106-PF | ELY15V100A |
| CN107-PF | ELY-18A205B |
| CN108-PF | EMCC0306D53 |
| CN109-PF | EMCC0720B62X |
| CN201-PF | EMCM1210B62 |
| CN202-PF | EMCHUM0201W |
| CN204-PF | EMCHUM0401W |
| CN205-PF | EMCM0315B52 |
| CN206-PF | EMCM0420B62X |
| CN207-PF | EMCM0201S |
| CN1001-PF | EMCM0920D62W |
| BI101 | EMCL1005D42V |
| BI102 | EMCM1210B65V |
| BI103 | EMCL0613D63W |
| BI104 | EMCL0309D62 |
| BI105 | YWS7-560P-45 |
| BI109 | EMCM0315B52 |
| E001 | EHLKM02D |
| M001 | YWV3030KR04 |
| M002 | YWCC500WB01 |
| M003 | YWCC500FR03 |
| M004 | YWCC704LB01 |
| M005 | YWCC500FR04A |
| M006 | YWCC500WM02B |
| M007 | YWCC704AM02A |
| M008 | YWCC704WM07 |
| M009 | YWCC704FM02 |
| M010 | YWCC704AM03B |
| M011 | YWV3030AMC4 |
| M012 | YWV3030EKR99<br>YWV3030NKR98 |
| M013 | YWV3030HR99 |
| M014 | YWV3030HR04 |
| M015 | YWV3030WR01 |



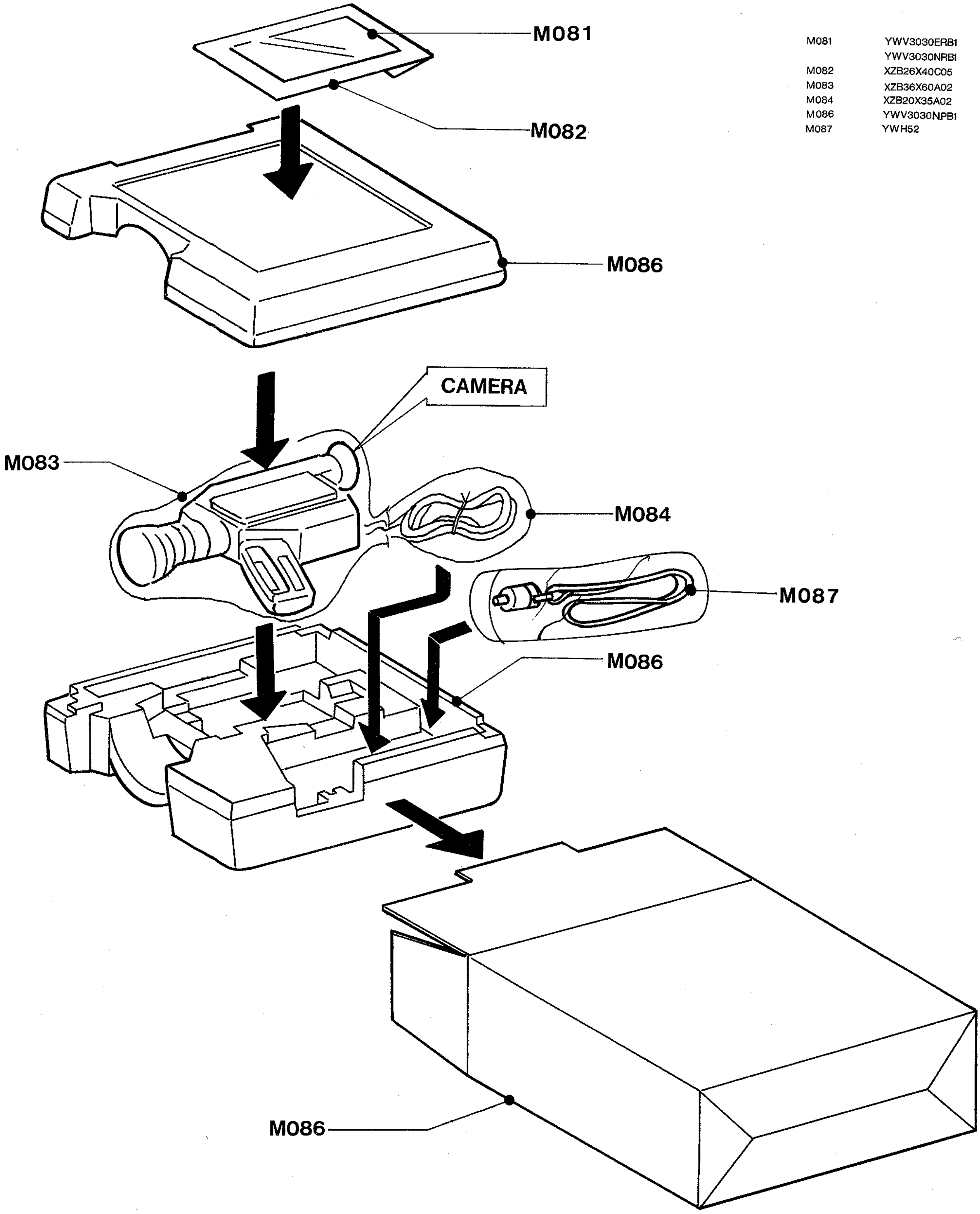
M003
M004
M005
M002
M009
M035
CRT001
M008
③
M007
②
M006
M033
M032
⑨
PCB010
M046
M017
M001
CN1001-JM
⑤
M045
M049
⑨
L002
D401
M048
D402
M037
⑤
⑧
⑥
D301
PCB004
②
M010
①
M038
M040
⑥
BI105
M011
CN004
CN106-PF
BI104
CN102-JM
CN105-JM
CN104-JM
M059
⑤
BI103
CN107-PF
M020
M019
No.1 8M
CN002
Q301
M018
CN001
②
⑤
BI109
BI102
⑧
⑩
M024
M026
⑤
⑥
CN003
M047
CN103-JM
⑧
V001
⑤
⑧
PCB003
M031
CN104
M023
M039
L001
CN107-JM
CN106-JM
BI101
PCB001
CN109-PM
M043
M021
⑥
CN601-JF
M042
PCB006
PCB002
CN202-PF
M022
M045
M059
CN204-PF
②
VR221
CN202-JM
⑤
M025
M027
CN103-PF
M030
M041
CN203-JM
CN205-JM
CN201-JM
M054
⑨
⑤
M053
CN206-JM
CN207-JM
Serial No. Label
CN204-JM
M012
PCB005
M052
M040
⑧
⑧
LENS UNIT
M050
⑨
M051
CN109-PF
PCB007
M066
PCB008
CN108-PF
M013
④
④
SW001
①
M016
M029
M069
M014
M055
M028
M015
M044
M062
M063
M069
④
PCB009
M056
②
M061
Mic901
M065
M067
M064
②
M068
M060

## ○ Numbers show screws

| NO. | Screws | Description |
|---|---|---|
| ① | XTN2+6B | Binding Head Tapping Screws |
| ② | XSB26+6FXK | Binding Head Screws |
| ③ | XSS2+5 | Flush Head Machine Screws |
| ④ | XTB26+8BFXK | Binding Head Tapping Screws |
| ⑤ | XSN26+6 | Binding Head Screws |
| ⑥ | XTN26+8BN | Binding Head Tapping Screws |
| ⑦ | XSN26+6BN | Binding Head Screw |
| ⑧ | XSN26+4 | Binding Head Screw |
| ⑨ | XSS26+6 | Flush Head Machine Screws |
| ⑩ | XYN26+F6FX | Machine Screw and Washer Assembly |

| | |
|---|---|
| M016 | YWV3030AM01 |
| M017 | YWV3030EKR98<br>YWV3030NKR98 |
| M018 | YWB26E2 |
| M019 | YWCC500LB17 |
| M020 | YWCC500AM12B |
| M021 | YWCC500CM01B |
| M022 | YWV3030CM01 |
| M023 | YWCC500FM02A |
| M024 | YWCC500FM03A |
| M025 | YWV3030WB99 |
| M026 | YWCC500XK10A |
| M027 | YWV3030FM01 |
| M028 | YWV3030HR01 |
| M029 | YWV3030HR02 |
| M030 | YWCC500FR05 |
| M031 | YWV3030UR03 |
| M032 | YWV3030KK03 |
| M033 | YWV3000EUM1 |
| M034 | YWV3030AM03 |
| M035 | YWCC500WM01 |
| M036 | YWV3030AM02 |
| M037 | YWCC704AM04 |
| M038 | YWV3804WB03 |
| M039 | YWCC500XK09A |
| M040 | YWCC500AM11 |
| M041 | YWCC900AM12 |
| M042 | YWV3030XK02 |
| M043 | YWV3030XK03 |
| M044 | YWV3030EUR1<br>YWV3030NUR1 |
| M045 | YWV3030XK01 |
| M04 | YW-G-UR02A |
| M047 | YWV3030EUR2 |
| M048 | YWCC500FR02 |
| M049 | V2SA0005A4 |
| M050 | YW614218<br>YW614222 |
| M051 | YW318131 |
| M052 | YW614022 |
| M053 | YW614023 |
| M054 | YW614039A |
| M055 | YW614037 |
| M056 | YW614038 |
| M060 | YWV3030KR05 |
| M061 | YWV3030KR06 |
| M062 | YWCC702KR03 |
| M063 | YWCC702WM99 |
| M064 | YWV3030DR99 |
| M065 | YWV3030WB01 |
| M066 | YWCC702HR02A |
| M067 | YWZC612FM01 |
| M068 | V2FA0004A4 |

# PACKAGING


M081
M082
M086
CAMERA
M083
M084
M087
M086
M086

| | |
|---|---|
| M081 | YWV3030ERB1 |
| | YWV3030NRB1 |
| M082 | XZB26X40C05 |
| M083 | XZB36X60A02 |
| M084 | XZB20X35A02 |
| M086 | YWV3030NPB1 |
| M087 | YWH52 |